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W. J. Gage & Co.'s Mathematical Series.

PROBLEMS IN ARITHMETIC

FOR

JUNIOR CLASSES.

PART I., FOR SECOND BOOK CLASSES.
PART II., FOR THIRD BOOK CLASSES.

BY

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Scholars' Edition.

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PREFACE.

In the course of fourteen years' experience as a teacher the compiler of this little hand-book of problems has gathered for class use, from various and numerous sources, many of which cannot now be acknowledged, a large number of practical problems for the purpose of more fully impressing the abstract rules, and for showing to classes how the same general principles apply to questions though their verbal dressing may bear no resemblance. Many of the exercises have been in successful class-room use for a number of years, which fact gives him confidence in submitting them now to the general public of teachers. Our older teachers will not feel the need of such a book of problems as the present to the same degree that our younger brethren will, and it is with a view of being of assistance to the latter that this collection is now a candidate for popular consideration.

In the final arrangement of the problems the author has not hesitated to enrich his own original collection by making selections from any works that he found suited to his purpose. He especially desires to make acknowledgment to the Public School Inspectors, who so generously furnished sets of Promotion Examination Papers, and to express his debt to Milne's "Practical Arithmetic." Appleton's "Numbers Applied," Ray's "New Practical Arithmetic," and Felter's "New Practical Arithmetic."

W. E. GROVES.

Church St. School, Toronto, July, 1892.

PROBLEMS IN ARITHMETIC

FOR JUNIOR CLASSES.

PART I.—SECOND BOOK.

I.

(1) A certain school had 40 girls and 30 boys in attendance. How many pupils were there in the school?

(2) A teacher paid $12 for a study lamp, and $15 for new music. How much did she pay for both?

(3) A boy bought a bicycle for $15 and a watch for $20. What did he pay for the two?

(4) Mary read 20 pages of a story book one day, 30 pages the next, and 25 pages on the third day. How many pages did she read in all?

(5) A merchant sold 15 yards of cloth to one woman, 25 to another, 30 to a third, and 25 to the last. How many yards did he sell to them all?

(6) In a certain book-case there are 18 books on the upper shelf, 20 on the next, 12 on the third, and 10 on the last. How many books in the case?

(7) A newsboy sold one day 50 papers, 65 the next day, and on the third day he sold 55. How many did he sell in the three days?

(8) John bought a reader for 25 cents, a copy book for 8 cents, a drawing book for 5 cents, and paid 10 cents for ink. What was his bill?

(9) Tommy had 31 pigeons, Ben had 28, and Fred had 31. How many had the three?

(10) Harry was in the country for a holiday, and, while out with his uncle, they saw a flock of wild ducks, 17 in number; they saw a second of 25, and a third of 30. How many ducks did he see?

II.

(1) Harry earned 52 cents on Monday, 24 cents on Tuesday, 35 cents on Wednesday, and 100 cents on Thursday. How many cents did he earn during the four days?

(2) If a man paid $125 for a horse, $220 for a yoke of oxen, $54 for a cart, and $130 for a buggy, what did he pay for all?

(3) Add together so as to find the number of each, 3 nuts, 20 apples, 15 nuts, 14 apples, 22 pears, 25 nuts, 11 pears, 101 apples, 52 nuts, 24 pears, and 13 nuts.

(4) I paid 245 cents for one book, 80 for another, 375 for a third, and 225 for the last. What did the four books cost?

(5) I owe one man $542; to a second, $327; to a third $478; and to a fourth, $983. How much do I owe?

(6) A farmer has 963 sheep in one field, 208 in another, 427 in another, and 530 in another. How many had he in all?

(7) The first five months has 151 days, the next five has 153 days, November has 30 days, and December 31. How many days in the whole year?

(8) I bought four pieces of muslin: the first contained 50 yards; the second, 65 yards; the third, 42 yards; the fourth, 89 yards. How many yards in all?

(9) I own three tracts of land: the first contains 240 acres; the second, 132 acres; the third, 25 acres. How many acres had I?

(10) I owe one man $210, another $142, and a third $35. What is the sum of my debts?

(11) Of a debt George paid $475, and Samuel paid the remainder, which was $625. What was the debt?

III.

(1) Commencing at 324, what is the sum of all the numbers below 335?

(2) Add all the numbers ending in 0, beginning with 110 and ending with 200.

(3) Find the sum of all the odd numbers, beginning with 441 and ending with 463.

(4) Find the sum of all the even numbers, commencing with 440 and ending with 563.

(5) What is the sum of all the numbers ending in 5 between 127 and 236?

(6) Find the sum of all the numbers, beginning with 349, taking only every third one, and ending with 367.

(7) Find the sum of all the numbers ending in 5 and 7, beginning with 455 and ending with 487.

(8) Find the sum of the seven numbers immediately following 497?

(9) Find the difference between the sum of the even numbers and the sum of the odd numbers, beginning with 240 and ending with 269.

(10) Find the sum of 287 and 613 each taken 6 times.

IV.

(1) A boy hoed 575 hills of corn on Monday, 630 hills on Tuesday, and 597 on Wednesday. How many hills did he hoe in the three days?

(2) A grocer sold a barrel of sugar for $28, ten barrels of flour for $108, and three barrels of pork for $18. What did he get for the whole?

(3) Harry walked 225 rods to the saw-mill, and then walked back to the place whence he started. How many rods did he walk in all?

(4) Add together 2413, 671, and 517.

(5) A field is 325 feet on each end, and 2426 feet on each side. How many feet around it?

(6) A crate of apples is worth 957 cents, while a crate of oranges is worth 1709 cents. How much are they both worth?

(7) 57 barrels of apples are worth $120, and a car load of beets is worth $118. What are the two together worth?

(8) I bought three barrels of potatoes: for the first I paid 320 cents; for the second, 287 cents, and for the third, $7.95. What did I pay for them all?

(9) Four farmers had their lands adjoining. The first had 113 acres, the second had 237 acres, another had 180 acres, and the fourth had 320 acres. How many acres had they among them?

(10) In one book there are 283 pages, in another 246, and in a third 387. How many pages in the three books?

V.

(1) On my farm are 640 oak trees, 748 ash trees, 639 beeches, 184 birches, 597 firs, 48 poplars, 186 maples, and 247 cedars. How many trees in all?

(2) One year a farmer made by his horses $364, by his cows $785, by his sheep $1,064, by his pigs $184, by his corn $304, by his hay $97, and by his oats $46. What did he make in all?

(3) A man paid $5,409 for a house, $1,209 for furniture, and $807 for various improvements. What did he pay?

(4) A man bought 30 barrels of pork for $285, 18 barrels for $144, 23 barrels for $235, and 34 barrels for $408. How many barrels did he buy and how much did he pay?

(5) A farmer has four flocks of sheep: in the first are 65 sheep and 43 lambs; in the second, 187 sheep and 105 lambs; in the third, 370 sheep and 243 lambs; in the fourth, 416 sheep and 95 lambs. How many sheep and how many lambs had he?

(6) Our school has six rooms on the second flat. In Mr. G's room there are 18 boys and 39 girls; in Miss K's room 58 girls; in Miss M's room 48 girls; in Miss S's room 64 girls; in Miss R's room 25 boys and 31 girls, and in Miss C's room 19 boys and 34 girls. How many boys on our flat? how many girls? and how many scholars in all?

(7) There are 620 words on one page of a boy's reader, on each of the next two pages there are 580 words, and on the fourth page the number is 600. How many words on the four pages?

(8) Out of a bag I first took 289 cents, then 397 cents, then 478 cents, then 693 cents, and then found 134 cents in the bag. How many did it contain at first?

(9) A house has two parlors requiring 60 yards of carpet, four bed-rooms requiring 100 yards, and a dining-room and sitting-room requiring 49 yards. How many yards of carpet needed for the whole house?

(10) A merchant sold a house and lot for $3,650, and by so doing lost $375. What had they cost him?

VI.

(1) The first of four numbers is 287; the second, 596; the third, 841; and the fourth as much as the first three. What is their sum?

(2) A man sold his piano for $413, his collection of paintings for $536, his library for $719, his carpets for $728, other furniture for $1,736, his horses, carriage and harness for $1,324, and his house for $9137. How much money did he obtain by the sale?

(3) A man making his will left $3,450 to his wife, $2,675 to his eldest son, $1,850 to his second son, and $1,290 to his youngest son. How much money did he leave by will?

(4) A man leaves in his will $7,850 to his wife, $3,275 to each of his two sons, and $2,650 to each of his three daughters. How much did he leave by his will?

(5) A real estate dealer (one who buys and sells houses and land) bought a house and lot for $1,964. He spent $384 in improvements, paid taxes $56, and then sold so as to gain $396. What did he get for the property?

(6) A merchant bought seven hogsheads of sugar, the weights of which were as follows:—No. 1, 960 lbs.; No. 2, 725 lbs.; No. 3, 830 lbs.; No. 4, 798 lbs.; No. 5, 698 lbs.; No. 6, 569 lbs.; and No. 7, 987 lbs. What was the total weight of the seven hogsheads?

(7) A town lot cost $750. A house was erected thereon, the cost of which was for carpenters' work, $2,000; masons' work, $765; painters' work, $265; and for other work, $327. What was the cost of the house and lot?

(8) A vessel took for her cargo from New York to London, cotton, wheat, flour, corn, and tobacco: the cotton was valued at $16,562; the wheat, $5,690; the flour, $25,645; the corn, $10,684; and the tobacco, $35,760. What was the value of the cargo?

(9) A fruit dealer shipped to Montreal 3,932 barrels of apples in one week, 2,436 barrels in the next, 4,197 in the third, and within the next month 10,937 barrels. How many barrels did he ship during that time?

(10) A man took 2,126 steps going from home to his place of business, 3,197 while in his store, 6,239 going from there to the park, 5,782 while in the park, 8,573 going from there home. What was the whole number of steps taken from the time he left until he re-entered his house?

VII.

(1) A man owns five horses. The first is worth $225; the second, $325; the third, $450; the fourth, as much as the second and the third together; and the fifth, as much as the first and the fourth. Find the value of the five horses?

(2) *A* and *B* were building a brick store. The first day *A* laid 2,136 bricks, and on the second day he laid as many as on the first day and 207 more. *B* on the first day laid 1,936, and on the second day 341 more than on the first. How many bricks were laid by both in the two days?

(3) A speculator bought five lots for $1,375 each. He sold the first for $125 more than cost, the second for $319 more than cost, the third for $291 more than cost, the fourth for $739 more than cost, and the fifth at a gain of $135. How much money did he receive for all?

(4) At the custom house, on June 1st, there was entered 1,800 yards of linen; on the 10th, 2,500 yards; on the 25th, 600 yards; on the day following, 7,500 yards; and on the last three days of the month, 1,325 yards each day. What was the whole amount entered during the month?

(5) A man dying leaves his only daughter $999, and to each of three sons, $200 more than he left to the daughter. What was each son's portion? also amount of whole estate?

(6) A merchant spent $8,785 for dress goods, and $12,789 for flannels. He sold the flannels at a profit of $1,250, and the dress goods at a gain of $878. How much did he get for the whole?

(7) In the first story of a house, the hall required 117 square feet of carpeting; the parlor, 327; the sitting-room, 296; the dining-room, 257. How many square feet of carpeting would be required to cover the floors of these rooms?

(8) The Old Testament contains 39 books, 929 chapters, 23,214 verses, 592,439 words, and 2,728,100 letters: the New Testament contains 37 books, 269 chapters, 7,959 verses, 181,153 words, and 838,380 letters. What is the total number of each in the bible?

(9) A man gave his property to his wife, two sons, and four daughters. To his daughters he gave $4,370 each, to his sons $6,045 each, and to his wife as much as to one son and to one daughter. What was the value of his entire property?

(10) The population of a certain city was 23,000 in the year 1865; in the next five years it gained 5,630; in the next five, 8,763; in the next five, 16,420; and in the following five, 22,109. How many inhabitants had it then?

VIII.

(1) Subtract 34,675 from 600,000.

(2) Take 93,299 from 100,603.

(3) How much less is 36,759 than 95,763?

(4) Find the difference when 373,737 is the subtrahend and 736,736 the minuend.

(5) How much greater is 77,777 that 69,898?

(6) By how much does $352,719 exceed $235,917?

(7) 1,000,000 – 199,876 = what?

(8) From 987,654,321 take 123,456,789.

(9) What is the difference between 109,309,500 and 423,000,406?

(10) Subtract 4,912 successsively from 15,679 till the remainder is less than 4,912.

IX.

In the following successively subtract the subtrahend from the minuend until the remainder is less than the subtrahend.

(1) 3469 569	(2) 3546 538	(3) 6793 769	(4) 8763 983	(5) 4367 499
(6) 7346 793	(7) 4326 479	(8) 4536 499	(9) 8469 799	(10) 9324 899
	(11) 8546 797		(12) 8967 869	

X.

(1) A house cost $3,705. The owner sold it, losing $596. What did he receive for it?

(2) A lot was worth $685 in 1881, and in 1891 was worth $7,261. How much had it increased in value in ten years?

(3) A man had $5,017, and spent $3,408. How much had he left?

(4) How many years from 1756 till 1891?

(5) What year was 115 years before this year?

(6) I had 61,200 tons of coal, and sold 16,002 tons. How many tons had I left?

(7) From nine hundred and ninety thousand and ninety-nine take nine thousand and nineteen.

(8) Toronto with a population of 185,761, has 98,346 males. How many females? How many more males than females?

(9) From 8,311 take the difference between 8,131 and 2,654.

(10) Suppose I had lent a man $1,565, and he died owing me $450. How much had he paid me?

XI.

(1) A carriage cost $137, and a horse $65. How much more than the horse did the carriage cost?

(2) A tree 75 feet high was broken: the part that fell was 37 feet long. How high was the stump?

(3) A man bought a house and lot for $5,650. He paid at different times sums amounting to $3,756. How much does he still owe?

(4) A girl had a $2 bill. She bought a book for 90 cents. How much change should she receive?

(5) A man sold a horse for $721. How much less than $1,000 did he receive?

(6) A trapper was 320 miles from Winnipeg. On the first day he walked 46 miles. How far was he then from Winnipeg?

(7) If a lady had $4,000 and lost $3,010, how much has she left?

(8) After a robbery, a banker finds $1,657 in his safe. The evening before he had left in it $9,336. How much had been stolen?

(9) How many times must 638 be taken from 7,280 to leave 900? to leave 262?

(10) How many times can 93 yards be cut from a piece of twine 385 yards long? How much will be left?

XII.

(1) A boy shot two arrows in the same direction. One went 387 and the other 433 feet. How far were they apart?

(2) John had a piece of tape 38 yards long. He cut off 13 yards. How many yards remained?

(3) A man bought a house, and sold it for $3,741, which was $341 more than he paid for it. What did the house cost him?

(4) A boy sold a bag of nuts for 371 cents, which is 122 cents more than he paid for them. What did he pay?

(5) America was discovered in 1492 A.D. How long ago was that?

(6) I put $1,840 into the bank and drew out $625. How much have I still in?

(7) A man took a contract for laying a piece of side-walk for $1583. He spent on the job $1356. Find his gain.

(8) A man worth $100,000 gave away $11. How much had he left?

(9) A certain post office took in during the year for stamps, etc., $10,986. The cost of managing the office was $4,371. Find profit to the government.

(10) The debt of a country in a certain year was thirteen million, two hundred and one dollars. Three years later the debt was $17,102,102. Find increase in the three years.

XIII.

(1) A merchant bought a vessel for $12,642, and gave, in part payment, a house worth $7,585, and the rest in cash. How much cash did he pay?

(2) A gentleman sold a farm for $15,896, which had cost him $12,264. How much did he gain?

(3) A man dies worth $13,462. He leaves his daughter $5,964. Find his son's share.

(4) A merchant bought a house for $6,450. He paid $4,625 in cash, and the rest in goods. What was the value of the goods?

(5) A steamer one week steamed 2,065 miles, while another steamed 1,986. How much further did one travel than the other?

(6) A vessel owner sold a schooner for $9,768, and thereby gained $1,862. How much had the vessel cost?

(7) How many years from the death of Queen Elizabeth in 1603 till the birth of Queen Victoria in 1819?

(8) A merchant bought 500 barrels of flour for $3,500. He sold 250 barrels for $2,000. How many barrels remained, and for how much must he sell them so as to lose nothing?

(9) A dry goods merchant bought 1,675 yards of cloth for $5,025. He then sold 335 yards for $1,005. How much had he left? and for how much must he sell it so as not to lose?

(10) A general wants an army of 75,425 men, and finds that he has only 49,846. How many more are required?

XIV.

(1) A merchant bought a quantity of goods for $1,248.65, and sold them for $1,540.00. How much did he gain?

(2) A man having $15,740.80 gave $5,085.00 for a store, and $7,640.75 for goods. What has he left?

(3) If a piece of property be bought for $7,086.86, and sold at a loss of $1,562.09, for how much was it sold?

(4) The minuend is 260,346, and the remainder 72,304. What was the subtrahend?

(5) The difference is $310.62, and the minuend is $1,206.28. What was the subtrahend?

(6) A man has $10,000. How much must he add to this to be able to pay for a farm worth $13,640?

(7) A man willed $125,000 to his wife and two children. To his son he gave $44,675, to his daughter $26,380, and the remainder to his wife. What was his wife's share?

(8) A merchant of Stratford goes to Toronto with $21,600. He buys groceries to the amount of $7,638.50, crockery worth $3,210.65, woodenware to the value of $1,245.18, and what then remained in hardware. How much did he invest in hardware?

(9) A merchant owns property valued at $75,860, of which $45,640 is invested in real estate, $25,175.75 in personal property, and the remainder he has in the bank. How much has he in the bank?

(10) Three persons bought an hotel valued at $42,075. The first agreed to pay $8,375.50, the second agreed to pay $16,751, and the third the remainder. How much was the third to pay?

XV.

Find the value of—

(1) 12,346 + 840 + 1,046 – 3,846.
(2) $210 + $809.76 – ($15.21 + $308.76).
(3) $600.09 – $276.25 + $5,682 – $654.
(4) $1,032.07 + $68.05 + $.98 – $1,000.
(5) 476,281 – 12,672 – 8,720 + 20,000.
(6) 376 + 1,684 + 573 – (931 + 1,000).
(7) $27.62 + $30.50 – $14 – $7.62.
(8) 17,300 + 6,840 – (5,800 + 1,386).
(9) (48,036 – 7,690) – (3,600 + 1,873) – 18,321.

(10) How many years from the date of each of the following events to the present year:—

(*a*) Figures were used by the Arabs in 890.

(*b*) Decimal fractions were invented in 1464.

(*c*) Printing was invented in 1441.

(*d*) The telescope was invented in 1610.

(*e*) The first passage of the Atlantic by steam was made in 1839.

(*f*) Gas was first used for street lighting in London in 1807.

XVI.

(1) From 153 yards of cloth I sold to *A* 27 yards, and to *B* 48 yards. How many yards remain?

(2) A man worth $19,000, lost at one time $3,427, and at another time $1,946. How much has he remaining?

(3) A York County farmer had 640 acres of land. He bought 266 acres, and then sold 512 acres. How many acres had he then?

(4) From the difference between 10,001 and 667 take the sum of 2,347 and 5,169.

(5) One day Hutton & Carr, Wingham, shipped to Halifax 463 barrels of flour, to St. John 95 barrels less than to Halifax. How many barrels did they ship that day?

(6) If to the sum of 7,749 and 5,928 you add their difference, what is the result?

(7) *A* and *D* commence business with $3,000 each. *A* lost $281, *D* gained $513. How much more is *D* now worth than *A*?

(8) *A* had $3,958, and *B* had $1,463. *A* lost $1.365, and *B* gained $1,165. Which then had the greater amount, and how much?

(9) *A*, *B*, and *C* were partners. *A*'s share was $12,500, *B*'s was $3,000 less than *A*'s, and *C*'s was $6,500 less than *B*'s. How much was the entire capital?

(10) A man gave to one of his sons $3,521; to the next, $94 less than to the first; to the third, $147 more than to the second; to the fourth, $99 less than to the third. How much did he give to all?

XVII.

(1) If the sum of two numbers is 36,251, and the greater one is 26,659, what is the smaller number?

(2) From the sum of 3,742 and 89,331, take the sum of 1,137, 2,065 and 3,820.

(3) Add 74,321, 85,746, 25,100, 321,098, subtract 26,304, and from the remainder take 54,876.

(4) Add the difference between 4,321 and 3,571 to the difference between 52,312 and 19,936.

(5) From the difference between 533,016 and 154,693, subtract the difference between 19,876 and 17,987.

(6) To what number must 893 be added four times to make 3,804?

(7) From what number must 309 be subtracted 5 times to leave 173?

(8) From what number must you take 8,763 to leave 3,849?

(9) To what number must you add 89,650 to make 108,731?

(10) How many times must 638 be taken from 7,280 to leave 900?

XVIII.

(1) A merchant deposited in a bank on Monday, $584; on Tuesday, $759; on Wednesday, $463. He drew out during that time $1,298. How much had he still in the bank?

(2) I bought a horse for $637, and a cow for $317. I sold the horse for $729, and the cow for $356. How much did I gain by the sale?

(3) In the first of three pavements there are 1,317 bricks, in the second there are 2,357, in the third 1,719 less than in the other two. How many bricks in the three pavements?

(4) *A* bought 351 acres of land, and *B* 27 acres more than *A*. *B* sold his land to *C*, who then had 537 acres. How many acres had *C* at first?

(5) On Monday morning a bank had on hand $1,826. During the day $2,191 was deposited, and $3,412 drawn out; on Tuesday, $3,256 was deposited, and $2,164 drawn out. How much money was on hand Wednesday morning?

(6) A gentleman is worth $15,795, of which $2,895 is invested in bank stocks, $3,864 in mortgages, and the rest in land. How much had he invested in land?

(7) A newsboy in the six working days of the week bought 76 papers a day, except Friday and Saturday, when he buys 10 more each day. He sold all but 3 on Monday, and 4 on Saturday. How many did he sell that week?

(8) A merchant buys 19,576 yards of cloth from one person, 27,580 yards from another, and 375 yards from a third. He sells 1,050 yards to one customer, 6,974 yards to a second, and 10,462 yards to a third. How many yards had he left?

(9) A merchant bought 85 hogsheads of sugar for $28,675; paid $1,231 freight on it, and then sold at a loss of $1,683. How much did he receive for it?

(10) Six men bought a tract of land for $36,420. The first man paid $12,140; the second, $3,035 less than the first; the third, $346; the fourth, $6,070 more than the third; the fifth, $1,821 less than the fourth. How much did the sixth man pay?

XIX.

Find the following values—

(1) 127 × 48 × 12 = ?
(2) 325 × 25 × 127 = ?
(3) 769 × 204 × 0 = ?
(4) 2070 × 68 × 102 = ?
(5) 3709 × 432 × 608 = ?
(6) 376 × 206 × 244 = ?
(7) 932 × 95 × 462 = ?
(8) 2008 × 0 × 187 = ?
(9) 7306 × 306 × 241 = ?
(10) 29087 × 736 × 802 = ?

XX.

(1) How much will 9 farms cost at $457 each?

(2) What will 126 barrels of flour cost at $6 a barrel?

(3) What will be the cost of 78 bonds at $4,096 each?

(4) What will 823 barrels of pork cost at $12 a barrel?

(5) A farmer went to Manitoba and bought a farm of 675 acres at a cost of $13 an acre. What did he pay for the farm?

(6) A wholesale house sold in one month 496 overcoats at $12 each. What was the whole lot worth?

(7) The same firm also sold 152 suits of clothes at $28 each. What were the suits worth?

(8) In one mile there are 1,760 yards. How many yards are there in 209 miles?

(9) A merchant in Georgia sold 4,090 bales of cotton at $78 each. How much did he receive for the lot?

(10) A drover bought 356 horses at $207 each. What did he pay for all?

XXI.

(1) A merchant bought 49 hogsheads of molasses, each containing 63 gallons. How many gallons of molasses did he buy?

(2) There are 1,040 men in each regiment. How many are there in 308 such regiments?

(3) In another regiment there are 1,128 soldiers. How many men in an army of 106 such regiments?

(4) There are 320 rods in a mile. How many rods from Toronto to Hamilton, a distance of 39 miles?

(5) Suppose a man were to travel 32 miles a day, how far would he travel in 365 days?

(6) How many soldiers are there in a body of men drawn up in 7 lines, each line having 758 men?

(7) In a train of 35 cars, each car weighs 9,260 pounds. Find the total weight.

(8) If 786 yards of cloth can be made in a factory in one day, how many yards can that factory turn out in one year? (313 working days in one year).

(9) Sound travels 1,090 feet in one second. How far will it travel in 25 seconds? in 42 seconds? in 1 minute, or 60 seconds?

(10) Light travels 185,500 miles in a second. How far will it travel in 28 seconds? in 1 minute, or 60 seconds? in 9 minutes?

XXII.

(1) What will be the cost of building 279 miles of railway at $27,384 a mile?

(2) What will it cost to build a telegraph line from Toronto to Montreal, a distance of 333 miles, at $1,270 a mile?

(3) The Erie R.R. is about 425 miles long, and cost $65,000 a mile. What was the total cost?

(4) The area of England and Wales is 58,614 square miles, and the average population is 445 persons to the square mile. Find total population.

(5) The Welland Canal is 41 miles long. If it cost $873,126 per mile to build, find what it cost the government.

(6) A man sold 41 barrels of vinegar, each containing 35 gallons, at 44 cents a gallon. How much did he receive for it?

(7) What will be the cost of 896 chests of tea, each chest containing 58 pounds, at 63 cents a pound?

(8) Gordon, McKay & Co., Toronto, bought for this spring's trade 113 cases of calico, each case containing 64 pieces, and each piece 47 yards. How many yards did they buy?

(9) Sold 13 firkins of butter, each firkin containing 56 pounds, at $.34 a pound. How much was received for it?

(10) What will a merchant give for 9 pieces of dress goods, each piece containing 54 yards, at 75 cents per yard?

XXIII.

(1) How many letters in a book of 96 pages, if each page contains 32 lines, and each line 36 letters?

(2) How many yards in 25 bales of cloth, each bale containing 42 pieces, and each piece 35 yards?

(3) How many pages in 4 editions of 3,000 books each, each book containing 127 pages?

(4) If a basket of peaches cost $1.50, what will 3 dozen baskets cost at the same rate?

(5) What must be paid for 125 boxes of starch, each weighing 5 pounds, at 8 cents a pound?

(6) At the rate of $2.25 a day, how much will 15 men earn in 4 weeks?

(7) A boy earns 75 cents a day every day in the year except Sunday. How much will he have earned at the end of the year? (313 working days in a year).

(8) Allowing 60 lbs. to a bushel, find the value of 25 bushels of potatoes at 1 cent per pound?

(9) Find the cost of 10 chests of tea, each weighing 35 lbs., at 45 cents a pound.

(10) How much should a party of five persons pay for their board for a year, at the rate of 60 cents a day?

XXIV.

(1) A merchant bought 58 pieces of cloth, each piece containing 94 yards, at $2 a yard. Find cost of the whole?

(2) A wholesale bookseller bought 45 sets of Chamber's Encyclopædia, each set containing 16 volumes, at $7 a volume. Find his bill.

(3) How many yards of sheeting in 57 bales, each bale of 26 pieces, and each piece of 44 yards?

(4) At the Banff Hotel there was an average of 278 guests. If each guest paid $16 a week for board, what sum would be paid by the guests in 9 weeks?

(5) In a certain cotton mill there are 94 looms, and each loom can weave 72 yards in a day. Find the number of yards the mill could turn out in 148 days.

(6) A train consisted of 18 cattle cars, with 20 head of cattle in each car. Find the total weight of the cattle, if each head weighed 1,018 pounds.

(7) Shipped to a Public Library Board 54 cases of books, each case containing 119 volumes, and worth $1.44 each. Find the bill.

(8) The rails on 1 mile of railway weigh 105 tons, and cost $88.80 per ton. Find the value of rails sufficient for a road 237 miles long.

(9) Find the total cost of 17 barrels of sugar, each weighing 287 pounds, at 9 cents a pound; and 19 barrels of molasses, each containing 39 gallons, at 58 cents a gallon.

(10) A merchant bought 24 webs of cotton, each containing 45 yards, at 7 cents a yard, and sold it for 11 cents a yard. Find his gain.

XXV.

(1) A man having $7,014, bought 9 sheep at $18 each, 7 cows at $46 each, and 89 acres of land at $47 an acre. How much money had he left?

(2) A man bought 87 horses at $125 each. For what sum must he sell the whole lot to gain $79 on each one?

(3) If out of a salary of $1,700 a year, a man pays $195 for board, $187 for clothing, $95 for books, and $475 for other expenses, how much can he save in 37 years?

(4) If out of a salary of $2,000 a year, a man spends $186 for board, $164 for clothing, $74 for books, and $469 for various other expenses, how much can he save in 29 years?

(5) A lady bought 14 yards print at 17 cents a yard, 29 yards at 27 cents a yard, and a pair of shoes at $2. Find her bill.

(6) A farmer bought 78 horses at $148 each. For what sum must he sell them to gain $234 on his bargain?

(7) What will a boy earn in 6 months, of 26 days each, at $.75 per day?

(8) On a branch line of railway 113 men are employed for 32 weeks, each earning $1.25 per day. Find the sum paid for wages.

(9) A grain buyer bought in one day 126 loads of grain. If each load contained 32 two-bushel bags, and grain sold for $1.10 per bushel, how much did he pay out that day?

(10) In the small boxes of chalk there are 12 dozen crayons. Find the number of crayons in 12 cases, each containing 36 boxes.

XXVI.

Solve the following, observing closely the model for the arrangement as shown in the first question. The teacher should see that in this exercise especially that there is no approach to carelessness in work. Care and neatness are of more consequence than the mere getting of answers.

(1) WHITBY, Feb. 5, 1891.

Mr. John Smith

Bought of *Thos. S. Brown.*

				$	c.
9	yards	silk	@ $1.40	12	60
17	“	calico	@ .07	1	19
21	“	muslin	@ .08	1	68
3	“	flannel	@ .90	2	70
10	“	ribbon	@ .45	4	50
14	“	broadcloth . . .	@ 3.50	49	00
17	“	cambric	@ .13	2	21
		Amount		$73	88

Received payment,

THOS. S. BROWN.

(2) WINGHAM, Sept. 15, 1891.

Mr. Robert Hill

In account with *M. H. McIndoo.*

3 pair kid gloves @ $1.35; 17 yards Malta lace @ $.76; 4 doz. handkerchiefs @ $1.80 per doz.; 1 doz. pairs linen cuffs @ $1.56 per doz.; 6 yards silk fringe @ $1.10; 3 ostrich plumes @ $3.25; 3 pairs cashmere hose @ $.65.

(3) BLUEVALE, Oct. 15, 1891.

Mr. James Henderson, Morris

Bought from *Wm. Messer.*

5 gals. vinegar @ $.27; 15 lbs. cheese @ $.09; 3 lbs. hominy @ $.45; 27 lbs. sugar @ $.07; 22 lbs. soap @ $.06; 3 gals. molasses @ $.70; and 6 lbs. prunes @ $.16.

(4) ORANGEVILLE, May 3, 1891.

Mr. Oliver Smith, Glenelg

Bought of *Green & Bowles.*

60 pairs overshoes @ $.65; 15 pairs boots @ $4.25; 17 pairs gaiters @ $3.85; 37 pairs slippers @ $1.75; 230 pairs driving mittens @ $.34; 2 doz. pairs slippers @ $9.00 per doz.; 2 pairs boots @ $9.50.

(5) Redway, March 17, 1891.
A. B. Smith
Bought from *C. G. Carr.*

9 lbs. lard @ $.08; 15 lbs. butter @ $.22; 18 lbs. pork @ $.06; 20 lbs. rice @ $.09; 12 lbs. raisins @ $.20; 4 cans oysters @ $.35; 10 lbs. codfish @ $.10.

(6) Wingham, May 26, 1891.
James Clow, Sr., Wawanosh
Bought of *Gordon & McIntyre.*

15 yards broadcloth @ $4.20; 24 yards satinet @ $1.37½; 10 yards vesting @ $.90; 42 yards flannel @ $.75; 60 yards drilling @ $.16; 12 yards silk @ $2.62½; 38 yards ticking @ $.52.

(7) Toronto, July 4, 1891.
Mr. T. A. Mills, Wingham
Bought from *Sloan & Crowther.*

10 chests green tea @ $36.25; 5 chests black tea @ $28.12½; 12 sacks Java coffee @ $19.80; 5 barrels "A" sugar @ $26.87½; 9 boxes raisins @ $5.42; 116 lbs. cheese @ $.12½; 132 lbs. rice @ $.08⅓; 25 lbs. pearl starch @ $.18; 6 boxes oranges @ $3.25.

(8) Toronto, Nov. 10, 1891.
Messrs. J. A. Cline & Co.
Bought of *Rice Lewis & Co.*

March 6, 5 doz. scythes @ $9 per doz.; 16 ploughs @ $10.37½; April 25, 4½ doz. hoes @ $5.48; June 16, 564 lbs. chain @ $.16½; 6¼ doz. steel shovels @ $11.72 per doz; Sept. 7, 120 sets blind hinges @ $.33⅓; 14 gross screws @ $1.62½.

Messrs. Cline & Co. have paid as follows;—

July 12, cash per registered letter $75; Aug. 20, cheque on Bank of Hamilton $28.46; Sept. 1, draft purchased at the Bank of Hamilton, $200; Oct. 26, order on T. Eaton & Co., $58.40. Find balance due Rice Lewis & Co.

(9) Wingham, Jan. 2, 1891.
Mr. M. W. Morton
Bought of *George Mason.*

5 blank books @ $2.30; 7 gross business pens @ $1.12½; 15 copies Complete Book Keeping @ $1.75; 4 reams cap. paper @ $3.40; 20 copies Division Court Law @ $2.87½; 12 packages plain cards @ $.37½; note paper and ink @ $2.78.

(10) WOODSTOCK, Sept. 13, 1891.

Mr. G. H. Chandler

Bought of *A. H. Carr.*

32 barrels flour @ $5.75; 512 bushels wheat @ $1.45; 6 barrels rye flour @ $3.10; 132 bushels oats @ $.27; 97 bushels rye @ $.83.

XXVII.

(1) At 2 cents each how many apples can I buy for 4,344 cents? The same money will buy how many peaches at 4 cents each? how many oranges at 6 cents each?

(2) If a man worked for $2 a day, how long would it take him to earn $748? $1,264? $3,216?

(3) If 2 wagons carry 4,896 pounds, how many pounds will one wagon carry?

(4) If 2 houses be worth $47,054, how much is one house worth?

(5) At 3 cents a yard, how many yards of ribbon can I buy for 384 cents? for 91 cents? for 1,875 cents? for 1,308 cents?

(6) If 3 farms cost $156,378, how much does one farm cost?

(7) Three times a certain number is 47,901,612. What is the number?

(8) If 3 bushels of apples fill a barrel, how many barrels will 255 bushels fill?

(9) If 4 cannon balls weigh 108 pounds, how much will one of the balls weigh? If they weigh 144 pounds, how much will one weigh?

(10) If 4 poles of equal length together measure 44 feet, what is the length of each pole? If they measured 132 feet, what is the length of each?

XXVIII.

(1) At $15 an acre, how many acres could be bought for $2,055?

(2) A man travels 13 miles a day. How long would it take him to travel 182 miles?

(3) If $1,083 be divided equally into 19 parts, how many dollars are there in each part?

(4) 11 head of cattle were sold for $1,287. Find the average price per head.

(5) A man raised 9,523 bushels of corn on 107 acres. How much was that on each acre?

(6) A hogshead contains 63 gallons. How many hogsheads in 23,373 gallons?

(7) A branch railway earns $480,705 in a year. How much is that per day, including Sunday?

(8) A colony of 684 men bought a tract containing 109,440 acres. If equally divided, find each man's share.

(9) The capital of a joint stock company is $432,860. If there be 3,764 shares, find the value of each.

(10) A railroad 238 miles long cost $3,731,840. Find the cost per mile.

XXIX.

(1) Find one-fifth of $3,670.
(2) " one-sixth of 1,236 lbs.
(3) " one-eighth of 27,304 days.
(4) " one-ninth of 18,252 yards.
(5) " one-third of 11,688 men.
(6) " one-quarter of 39,676 hours.
(7) " one-seventh of 26,222 miles.
(8) " one-tenth of 374,160 minutes.
(9) " one-twelfth of 51,792 tons.
(10) " one-eleventh of 92,114 feet.

XXX.

(1) Into how many lots of 39 acres each, can a tract of land containing 6,318 acres be divided?

(2) A dealer bought 17 horses for $4,386. Find the average price of the horses.

(3) There being 320 rods in a mile, if, in a week, a tramp walked 41,600 rods, how many miles did he walk?

(4) At $.38 a dozen, how many eggs can be bought for $6.84?

(5) How many feet are there in a mile, if 84 miles contain 443,520 feet?

(6) A railroad earned $4,805,225 in a year. How much is that per day? (One year = 365 days).

(7) 73 men own 894,250 bushels of grain. How much is that for each man?

(8) 600,242 yards of cotton are put up in rolls of 79 yards in each. How many rolls?

(9) In 622 rows there are planted 23,636 fruit trees. How many trees in each row?

(10) At a bridge there was collected $21,170 in one year. How much was that for each day? (One year = 365 days).

XXXI.

(1) In 91 boxes are packed 27,027 books. How many books in each box?

(2) $28,000 was the price paid for 117 acres of land. What was the price per acre?

(3) The manager of a furniture factory paid $158,649 to 163 hands in the course of a year. What would that amount be for each man, if all were paid the same wages?

(4) The pay-master of a regiment paid out to his men at one time $62,400. If there were 967 men in the regiment, how much was there for each one?

(5) A flour mill made 28,679 barrels of flour in 351 days. What was made in one day?

(6) At the rate of $63 an acre, how many acres can be bought for $176,202?

(7) A man owned 19 acres of land worth $71,919. What was the value per acre?

(8) If a man count 6,785 in a day, how long would he require to count 51,423,685?

(9) A railroad 269 miles long cost $3,506,295. What was the cost per mile?

(10) In 14 large bins in a grain elevator are stored 710,008 bushels of wheat. How many bushels in each bin?

XXXII.

(1) In a book of 96 pages of 32 lines to the page there are 110,592 letters. How many letters in a line?

(2) If there are 36,750 yards in 25 bales of tweed, each bale containing 42 pieces, how many yards in a piece?

(3) 3 dozen baskets of peaches cost $54. What is that per basket?

(4) Find the price of starch per pound, if 125 boxes, each of 5 pounds, cost $50.

(5) 15 men in 4 weeks earned $810. Find the daily wages of one man.

(6) By working every day in the year except Sunday, a boy earns $234.75. Find how much he would earn in 1 day.

(7) Ten chests of tea sold for $157.50. If the price per pound were 45 cents, how many pounds were there in a chest?

(7) Ten flocks of sheep, each flock having 25 head, were sold for $2,000. Find the price per head?

(9) $312.48 was paid for 48 barrels of coal oil, each barrel containing 31 gallons. What was the price per gallon?

(10) A lady brought to market 28 rolls of butter, which she sold to a merchant at 29 cents a pound, receiving for the lot $81.20. How many pounds were there in a roll?

XXXIII.

(1) How many bushels of apples @ 60c. will pay for 35 lbs. of tea @ 84c.?

(2) How many bushels of peaches @ $3.50 will pay for 25 tons of coal @ $6.30 ?

(3) How many pieces of muslin (39 yards) @ 12c. will pay for 26 tubs of butter (72 lbs. each) @ 32c.?

(4) How many tons of hay @ $12.18 will pay for 3 barrels of sugar (232 lbs. each) @ 9c.?

(5) How many horses @ $91 will pay for 7 acres of land @ $559?

(6) How many cows @ $39 will pay for 650 sheep @ $3.00?

(7) How many tubs of butter (54 lbs. each) @ 28c. will pay for 378 yards muslin @ 16c?

(8) At what price will 65 lbs. of coffee pay for 26 bushels of potatoes @ 45c.?

(9) At what price will 75 acres of land pay for 21 horses @ $125 each?

(10) At what price will 26 barrels of pork pay for 78 barrels of flour @ $6.00?

(11) At what price will 260 dozen eggs pay for 78 yards of silk @ 90c.?

XXXIV.

What is the sum of—

(1) $6.50, $8.96, $5.12, $17.63, $91.40, and $16?

(2) $75.19, $63.54, $3.06, $9.25, $65.37, $416.12, $375, $600, and $5?

(3) $861.55, $378.25, $461.37, $683.57, $728.39, $460.08, and $17?

(4) $18.50, $3,780, $658.06, $358.653, $818.047, $67.375, and $486.395?

(5) $398.007, $5.65, $885.307, $43.936, $729.063, $335.72, $8,316.472, $3,768.082, and 56 cents?

(6) $116.23, $270.036, $4.009, $100.05, and $.75?

(7) $5.097, $.083, $5.629, $15.912, $4.691, $59.03, $16.001, and $18.875?

(8) $.187, $9.987, $4.46, $.365, $73.28, $83.18, $1, $5.000, $3.057, and $15.01?

(9) $793.104, $38.796, $596.647, $764.521, $990.901, $881.725, and $9,651.062?

(10) $1, $342.06, $3.501, $917.624, $249.387, $1,800, and $71.875?

XXXV.

(1) A gentleman has his property made up as follows:—Land, $3,560; house, $1,834; barn, $690; horse, $180; carriage, $135; tools, $382.95; money in bank, $987. How much was he worth?

(2) Mr. Johnston bought a suite of furniture for the parlor, costing $385.75; one for the sitting-room, costing $229.55; one for a bed-room, costing $176.25: and one for the dining-room, costing $194.40. Find cost of the four suits.

(3) Mrs. D. paid the butcher on Monday, $.60; on Tuesday, $.78; on Wednesday, half a dollar; on Thursday, ¾ of a dollar; on Friday, 40 cents; and on Saturday, $1.10. How much in all?

(4) A gentleman collected from *A*, $390.35; from *B*, $29.05; from *C*, $50.10; from *D*, $37.12½; from *E*, $112.87½. How much did he collect in all?

(5) A merchant sold goods on Monday, amounting to $170.09; on Tuesday, $199.01; Wednesday, $80.09; Thursday, $166.66; Friday, $105; Saturday, $206.09. Find the week's sales.

(6) A merchant bought a house for $5,000, a store for $6,290, merchandise for $23,654.12, a horse and wagon for $278.53, a farm for $9,371.60, railroad stock for $11,500, and a watch for $92.75. What did the whole amount to?

(7) William has the following bills for collection:—$43.75, $29.18, $17.63, $268.95, and $718.07. How much was to be collected?

(8) Bought a gig for $200, a watch for $43.87, a suit of clothes for $56.93, a silk hat for $8.50, and a whip for $2.31. What was the amount?

(9) A man pays $600 for a lot, $1,325 for building materials, $30 for digging the cellar, $120 for stone work, $250 for brick work, $140 for carpenter work, $120 for plastering, and $115 for painting. How much did his house and lot cost him?

(10) A man leaves by will to his wife $7,850, $3,275 to each of his two sons, and $2,650 to each of his three daughters. What was his property worth?

XXXVI.

(1) From $189.25 take $132.10.
(2) " $200.01 " $75.19.
(3) " $700 " $516.25.
(4) " $658.375 " $400.00.
(5) " $905.002 " $431.75.
(6) " $340.75 " $29.99.
(7) " $9,000 " $9.99.
(8) " $77.179 " $.179.
(9) " $23,467.06 " $15,729.489.
(10) " $6,958.375 " $1,400.75.

XXXVII.

(1) From one hundred and ninety dollars take nineteen cents seven mills.

(2) From $707 take ninety-seven cents, eight mills.

(3) From $1,000 take 1,000 mills.

(4) From 18,600 cents take $150.

(5) A man had $365.25: he spent $136.27. How much had he left?

(6) Bought a horse for $185.50, and sold it for $163.75. Find my loss.

(7) Bought a house for $4,560.37, and sold it for $4,800. Find my gain.

(8) A man had $200. He bought a horse for $155, a saddle for $27.50, a bridle for $7.37, and a pair of spurs for $1.25. How much money had he left?

(9) A grain dealer bought $10,000 worth of wheat. To one person he sold $2,300 worth, to another $350 worth, and to another $67 worth. What was the value of the remainder?

(10) A person had $50,000. He bought a horse and wagon for $550, a house for $3,750, built a store which cost him $7,875, and bought groceries to the amount of $1,895.63. How much has he left?

XXXVIII.

(1) In January, 1891, a merchant bought goods to the value of $2,675; in February. $4,375; and in March, $1,897. After making one payment of $3,000, and another of $4,947, how much does he still owe?

(2) I owe three notes, whose sum is $1,300—one note being for $250, and another for $650. What is the amount of the third note?

(3) M. J. deposited $450 in the bank on Monday; on Tuesday, $725; on Wednesday, $1,235; on Thursday, $4,675; and on Friday, $1,727. On Saturday morning he drew out $5,935, and on Monday forenoon of the next week $877. How much money had he left in the bank?

(4) At the end of one year I found that I had spent $2,300. Of this amount $350 was paid for board, $125 for clothes, $375

for books, $150 for various other expenses, and the remainder for two acres of land. What did the land cost?

(5) A gentleman bought three houses. For the first he gave $4,875; for the second, $2,250 more than for the first; and for the third he gave $3,725. He afterwards sold the three for $20,838. How much did he gain?

(6) A man owns property valued at $49,570, of which $16,785 is in personal property, and $24,937 in real estate (lands and houses); the remainder was deposited in the bank. How much has he in the bank?

(7) A merchant bought a bill of goods for $7,895, and paid $175 freight, and $3 cartage. He sold the goods for $10,093. How much did he gain?

(8) A farmer invested $10,000 as follows:—In land, $5,750; in horses, $925; in cattle, $1,575; in hogs, $675; and the rest in tools and instruments. How much does he invest in the implements?

(9) A speculator on Monday gained $4,625; on Tuesday, $3,785; on Wednesday he lost $6,955; on Thursday he lost $895; on Friday he gained $985; and on Saturday he lost $1,375. How much did he gain in the week?

(10) The following is Mr. B.'s private account for two weeks:—First week, he received for salary $50; and spent $25 for clothing, $7 for board, $2 for washing, and $5 for sundries. Second week, received $50 for salary; loaned $35 to Tom Jones, paid $7 for board, $2 for washing, and $8 for sundries. How much did Mr. B. have at the end of two weeks?

XXXIX.

(1) What is the cost of 89 yards of print @ 34 cents a yard?

(2) What will 24 yards of cloth cost @ $5.67 a yard?

(3) At $3.25 a bushel, what will 256 bushels of peaches cost?

(4) Bought 144 arithmetics @ $.375 each. Find the cost?

(5) Find the cost of 118 bushels of apples @ $.925 a bushel.

(6) I have 169 sheep valued @ $2.69 each. What is the value of the whole?

(7) If I sell 691 bushels of wheat @ $1.25 a bushel, what will it amount to?

(8) If 1 barrel of flour cost $6.75, what will 29 barrels cost?

(9) If 1 cord of wood be worth $9.625, what will 278 cords be worth?

(10) If 1 acre of land cost $488.69, what will 625 acres cost?

XL.

(1) What is the cost of 15 cases of wine, each case containing 12 bottles, @ $1.25?

(2) Find the cost of 19 barrels of vinegar, each containing 47 gallons, @ $.12 a gallon.

(3) A merchant bought 8 bales of cloth, of 72 yards each, @ $4.12½ a yard. Find the cost.

(4) I sold 73 hogsheads of molasses, of 63 gallons each, @ 55 cents a gallon. Find the proceeds.

(5) A merchant sold 4 barrels of sugar, of 281 lbs. each, @ 6½ cents a lb. Find the value.

(6) Find the money realized on the sale of 18 bags of wheat, of 3 bushels each, @ $1.25 a bushel.

(7) What is the value of 17 bags of coffee, of 51 lbs. each, @ 24 cents a lb.

(8) A grocer bought 9 barrels of cider, each barrel containing 30 gallons, @ 12½ cents a gallon. What did the cider cost?

(9) A load of coal contains 25 bushels. Find the cost of 90 loads @ 14 cents a bushel.

(10) An egg merchant shipped 35 boxes, each containing 75 dozen eggs. If the eggs be worth 15 cents a dozen, what should the merchant receive?

XLI.

(1) 27 cases of books were bought for a library, each case held 238 books, and each book was worth 96 cents. Find the total value.

(2) The keeper of a summer hotel charges $16 a week for board. He has 278 boarders for 9 weeks. What does he receive for board?

(3) A person bought 561 lbs. of cheese @ 15 cents a lb., and 398 lbs. of coffee @ 17 cents a lb. What did he pay?

(4) Mr. A. sold 476 yards of tweed @ $1.75 a yard, and 667 yards @ $1.85 a yard. How much money did he receive?

(5) A grocer sold 81 dozen eggs @ 26 cents a dozen, and 53 dozen @ 28 cents a dozen. How much money did he receive for the eggs?

(6) A drover bought 25 oxen @ $85 a head, 316 sheep @ $4.50 a head, and 94 calves @ $8 a head. What was the whole amount paid?

(7) Mr. H. bought 350 bushels of corn @ 65 cents a bushel, 215 bushels of wheat @ $1.35 a bushel, and 273 bushels of oats @ 43 cents a bushel. What did the whole cost him?

(8) A flour merchant sold 291 barrels of flour @ $7.20 a barrel, 2,961 bushels of corn @ $.54 a bushel, and 398 bushels of barley @ 78 cents a bushel. How much did the whole amount to?

(9) A merchant bought three bales of cloth. The first had 485 yards; the second, 492 yards; and the third, 497 yards. If he paid $1.87½ a yard, find the cost.

(10) The merchant referred to in No. 9 sold the two bales first mentioned @ $2.25, and the last one @ $2.75 a yard. What did he receive for the cloth?

XLII.

(1) Divide $345 equally among three men.

(2) Divide $7,807 into 37 equal parts.

(3) 133 men were paid $1,040.06 as wages. Find the sum earned by one man.

(4) What is the ⅛ of $80.24?

(5) If 96 yards of cloth cost $552, what will 1 yard cost?

(6) If 125 barrels of flour cost $650, what will 1 barrel cost?

(7) 144 lbs. of tea cost $108. What will 1 lb. cost?

(8) 90 yards of satin cost $315. Find the price per yard.

(9) 70 barrels of apples were bought for $175. Find the price per barrel.

(10) If 320 bushels of oats cost $262.40, what will 1 bushel cost?

XLIII.

(1) If 16 horses cost $2,560, find the cost of 7 horses.

(2) If 13 lbs. of tea cost $9.88, what will 212 lbs. cost?

(3) If 160 bushels of wheat cost $440, what will 311 bushels cost?

(4) What will 35 acres of land cost if 56 acres cost $16,657.20?

(5) $18,738.75 is the cost of 19 city lots. What should be paid for 38?

(6) If a yard of satin cost $3.50, how many yards can be bought for $315?

(7) A keeper of a toll-gate collected $58 a day in tolls. How long would he be in collecting $21,170?

(8) How many acres of land can be bought for $87,725 @ $275 an acre?

(9) Find each man's share when $447,125 is divided among 73 men.

(10) At $1.37 a yard, how many yards of tweed can be bought for $157.55?

XLIV.

(1) I owe *A*, $47.50; *B*, $38.45; *C*, $15.47; *D*, $19.43. What sum do I owe?

(2) A lady had $20. She bought a dress for $8.10, shoes for $5.65, 8 yards of cashmere @ 25 cents a yard, and a shawl for $4. How much money had she left?

(3) A farmer sold his produce to a merchant for $21.75. He paid for sugar $3.85, for tea $1.25, for coffee $2.50, for spices $1.50. How much had he left?

(4) Bought 143 lbs. of coffee @ 23 cents a lb. After paying $12.60, what was due?

(5) Bought 21 barrels of apples, of 3 bushels each, @ 35 cents a bushel. What did they cost?

(6) Find the cost of 4 pieces of cambric, each containing 19 yards, @ 23 cents a yard.

(7) If 25 men do a piece of work for $2,000, and spend while doing it $163.75, what will be each man's share of the profit?

(8) A drover bought 3 horses for $314, 3 cows @ $36 each, and 12 sheep for $58. He gave in payment five $100 bills. How much change should he get?

(9) A laborer worked 80 days @ $1.87½ per day. How much did he earn?

(10) A farmer owed $500, and gave in payment 435 bushels of wheat @ $1.02 a bushel. How much money was yet due?

XLV.

(1) Mr. J. paid me $27.34; Mr. N., $79.14; Mr. F., $34.27; Mr. M., $647.79. My expenses on the tour of collection were $19.68. When I started I had $50.75 in my purse. How much money should I have on my return?

(2) A lady had $30. She bought a dress for $9.15, shoes for $3.40, a bonnet for $4.50, and 23 yards of muslin @ 25 cents a yard. How much had she left?

(3) Mr. Jordan sells Mr. Marsh the following articles:—3 cashmere shawls @ $45.75 each, 45 yards of satin @ $2.20 a yard, 12 alpaca umbrellas @ $1.35 apiece, 60 linen handkerchiefs @ $.35 each. Find the bill.

(4) Subtract $37.87 from $237.37. From the remainder subtract $37.87, and continue subtracting till the remainder is less than the subtrahend. What is the remainder? Is this the shortest way to find the remainder?

(5) A store-keeper who was about to pay some debts, found that he had in change $37.45, in bank bills in his money drawer $76, $318 in his safe, and $98.36 in his pocket book. How much had he left after paying five bills of $56.10, $38.05, $48, $213, and $78.90 respectively?

(6) Multiply $4.35 by 2; multiply the product by 3; multiply the second product by 4; the next by 5; the next 6; and that by 7. What is the last product?

(7) A person sells 5 cows @ $55 each, a yoke of oxen for $125. He agrees to take in payment 80 sheep. How much do the sheep cost him per head?

(8) A farmer bought goods amounting to $235.75. He pays in cash $58.25, and agrees to pay the balance in rye @ $1.25 a bushel. How many bushels will he require?

(9) Find the value of 15 reams of foolscap @ 17 cents a quire. (One ream = 20 quires).

(10) In 1885, I paid $52.23 taxes; in 1886, $50.79; in 1887, $46.27; in 1888, $44.83; in 1889, $42.21; and in 1890, $40.90. How much did I pay in the six years? The repairs to my house in the same time cost $238.65. For the first three years I received $650 per year rent; for the last three years, $700 per year. How much did I receive in the six years clear of expenses?

XLVI.—Making Change.

(1) You buy three pounds of rice @ 9 cents a lb., and hand the grocer in payment a dollar bill. How does he count the change out to you?

(2) Having only 5c. and 10c. pieces, how will the change be counted, taking 15c. out of $1?

(3) Having 1c., 5c., 10c. pieces, and $1 bills, how would you make the change for 35 cents out of $2? For 85 cents out of $5? For 75 cents out of $10? For $1.12 out of $1.50? For $6.03 out of four $2 bills? For 67 cents out of a $2 bill? For $3.33 out of $5?

(4) A merchant has in his till only 25c. and 50c. pieces, and $1 bills. You buy goods to the value of $2.75, and you give him a $5 bill. How may he make change?

(5) If a merchant has only $1, $2, and $5 bills, and 1c. and 5c. pieces, how will the change for $3.27 be counted out of a $20 bill?

(6) Having 1c., 5c., 25c., and 50c. pieces, and $2 bills, how can you count the change for $1.15 out of $5? For $2.31? For $3.17? For $1.84? For $4.66? For $4.11? For 93 cents? For $4.46?

Count out the proper change in each of the following transactions:—

(7) 5 lbs. coffee @ 32 cents, 5 lbs. sugar @ 9 cents, 3 lbs. cheese @ 14 cents. Money received, $5.

(8) 2 lbs. beef @ 19 cents, 2 lbs. butter @ 42 cents, radishes 10 cents. Money received, $2.

(9) 3 lbs. soap @ 10 cents, 2 lbs. starch @ 12 cents, 1 paper of spice @ 12 cents. Money received, $1.

(10) ½ lb. tea @ 90 cents, 4 lbs. sugar @ 11 cents, 1 box strawberries 10 cents. Money received, $2.

XLVII.—Roman Notation.

Roman notation is a method of representing numbers by means of letters. It is so called because in use among the Romans. It is now used to number chapters in books, and dials of clocks.

The following table gives a complete view of the method of representing numbers by letters :—

THOUSANDS.	HUNDREDS.	TENS.	UNITS.
M.	C.	X.	I.
MM.	CC.	XX.	II.
MMM.	CCC.	XXX.	III.
$\overline{\text{IV}}$.	CD.	XL.	IV.
V.	D.	L.	V.
$\overline{\text{VI}}$.	DC.	LX.	VI.
$\overline{\text{VII}}$.	DCC.	LXX.	VII.
$\overline{\text{VIII}}$.	DCCC.	LXXX.	VIII.
$\overline{\text{IX}}$.	CM.	XC.	IX.

$\overline{\text{X}} = 10,000$.

A bar over a letter or a combination of letters increases the value a thousand times.

(1) Read XXIV., LX., XLIV., LXXXIX., XC., XCIX., CCI., CCCXCIX., CD., CDLVIII., DV., DXLVI., DCCCIX., CMXCIX., MD., MIX., MDCCCXCII., $\overline{\text{MCDLXX}}$.

(2) Write in Roman numerals 83, 38, 49, 98, 108, 319, 444, 333, 991, 3,847, 2,563, 3,482.

PROMOTION EXAMINATION PAPERS.

SECOND TO THIRD BOOK.

WELLINGTON, 1891.

(1) Add 947682 + 9876 + 394 + 87 + 61007 + 5476 + 41 + 8907 + 808 + 766982.

(2) Express in words 10000071, 9000900, 716100754.
Express in Roman numerals 449, 904, 1891.
Express in figures MDCCIX., DCXL., CMXCIV.

(3) Multiply 9608276 by 7060980.

(4) (*a*) Take six thousand and six from sixteen million and sixteen.
(*b*) 21000768 – 3100969.

(5) Divide 976272 by 946; 409354 by 809.

(6) A person sold 648 sheep at $14 each, and bought a cow with $72 of the money received. How many horses costing $180 each can he buy with the remainder of the money?

(7) A farmer sold 63 bushels of wheat and 28 bushels of oats for $56.77. If he received 75 cents a bushel for the wheat, how much per bushel did he get for the oats?

(8) A lady bought 17 yards of silk at $1.50 a yard, 12 yards of lining at 48 cents a yard, 10 yards of trimming at 35 cents a yard, buttons for 75 cents, thread for 33 cents, and silk twist for 55 cents. How much less $50 did her purchases cost?

(9) The wages of 867 men for a week is $7,803. What pay does each man get a day?

(10) John rises every day one hour earlier than his brother Harry. How many days of 10 hours each does John thus gain on his brother in a year?

(11) A man bought a horse for $119, and immediately sold it for $136. How many would he have to buy and sell at these rates to gain as much as one cost him?

(12) A farmer bought 225 acres of land for $10575, and then sold it at $48 an acre. Did he gain or lose, and how much?

GREY, 1891.

(1) How many are 19876 – 39478 + 67289 – 3672 + 44666 – 8964 – 8623 + 46389? Write the answer in words.

(2) Multiply 498765 by 9467, divide the product by 56 using factors and short division, and find true remainder.

(3) Multiply 67894868238 by 628.

(4) The product is 6787288, the multiplier 824. Find the multiplicand.

(5) Sixteen times the sum of eight equal numbers is 22486528. Find the difference between the sum of the first three of the numbers and the sum of the other five.

(6) A boy walks from Flesherton to Dundalk at the rate of 24 miles in 6 hours. If he start at 10.30 o'clock a.m., and reach Dundalk at 1 p.m., how far is Dundalk from Flesherton?

(7) 80 car loads of fence posts are shipped from a certain station. If each car contain on the average 400 posts, and the freight on each car be $17.50, what must the posts be sold for, per 100, to gain $840, if the cost of each was 15 cents?

(8) How much would you have left after paying the following account out of a $10 bill:—3 lbs. of tea at 75 cents a lb.; 4 lbs. of coffee at 30 cents a lb.; 19 lbs. of rice at 6 cents a lb.; 6 dozen eggs at 2 cents each; 25 lbs. of sugar at 9 cents a lb.?

(9) A man received a salary of $600 a year, payable monthly. At the end of each month he pays $12 for board, $10 for books, $8 for clothing, and $9.75 for other expenses. How much can he save at this rate in five years?

(10) Arrange the following numbers as for addition, find their sum and divide it by 829: One million, six hundred and seven thousand, four hundred and eighty-two; nine hundred and nine thousand, three hundred and two; eighty-seven thousand, three hundred and forty; six thousand and four; one million, forty thousand, three hundred and sixty-six. Write the quotient and remainder in Roman numerals and in words.

LANARK, 1891.

(1) Explain Dividend, Addend, Minuend, Multiplicand.

(2) Divide the sum of LXXXVIII., 498, XLIX., 7958 by the difference between DCIV. and 257.

(3) A man bought 1,800 barrels of flour a $7 a barrel. He sold 800 barrels at $12 a barrel, and the remainder at $5 a barrel. Did he gain or lose, and how much?

(4) Multiply the sum of 8569, 598, 79, 898469, 78578, and one thousand and one by seventy thousand and ninety.

(5) I sold a house for $4500, and 268 acres of land at $75 an acre. I got payment $5000 in cash, and 239 cattle at $25 each. How much was still owing me?

(6) I bought 89 yards of cloth at 42 cents a yard, and sold 25 yards at 40 cents a yard. For how much a yard must I sell the remainder to gain 526 cents on the whole?

NORTH HASTINGS, 1891.

(1) Define the following terms accurately :—Arabic Notation Concrete Number, Multiplication, Quotient.

(2) How many times must 133 be added to 70 times 87 to give twenty-six thousand, one hundred and seventy-three?

(3) Multiply 320479 by 897604, and prove the correctness of the result by division.

(4) How many bushels of wheat, at 95 cents a bushel, can be bought for 152 bushels of oats, at 40 cents a bushel?

(5) Divide 3794607 by 24, by factors, and write after each line its name.

(6) To how many men could you pay $87 each, after paying 31 men $9 each, if you had $801 at first?

(7) A person bought 225 acres of land for $25300, and sold it again at $116 per acre. Did he gain or lose by the transaction, and how much?

(8) John Butler bought from James Jones the following articles :—14 lbs. of sugar at 8 cents, 15 lbs. of tea at 35 cents, 16 lbs. of soap at 6 cents, 19 lbs. of rice at 6 cents, and a number of smaller articles which cost $4.27. In payment, he gave a $10 bill and a $5 bill. How much should be returned to him?

(9) Find the value of 97659 + 30479 – 26914 – 9436 + 8761 – 14719 – 789 + 47.

SOUTH HASTINGS, 1891.

(1) From 13146271 take 5929439, and divide the remainder by the factors of 48.

(2) Multiply 7896 by 8907, and divide the product by 900, short division.

(3) If I paid $3332 for 49 acres of land, what would 98 acres be worth?

(4) A man having $16000, spent $439 for horses, $128 for cows, $96 for sheep, $898 for furniture, $97 for provisions, and $45 for clothes. How many acres of land at $17 an acre could he buy with the money he had left?

(5) At $71 each, how many village lots can be bought for $1491213?

(6) A woman sold 27 lbs. of butter at 23 cents a lb., and bought 13 lbs. of sugar at 7 cents a lb., and 4 lbs. of coffee at 35 cents a lb. How many lbs. of tea at 65 cents a lb. could she buy with what was still left of the amount she got for the butter?

(7) Divide 3876894 by 35, by factors, and write after each line its name.

(8) Find the difference between the sum of 73927 and 8496, and the product of 1987 and 39.

(9) I bought 28 lbs. of rice at 9 cents a lb., 12 lbs. of sugar at 11 cents a lb., 4 lbs. of tea at 75 cents a lb., and 3 lemons at 3 cents each. What change should I receive if I gave a $10 bill in paying?

(10) A man bought 78 horses for $11544. At what price must he sell each horse so as to gain $234 on the whole lot?

HURON, 1891.

(1) Add 8931 + 872 + 98831 + 9832 + 8762 + 7918.

(2) Divide 673540212 by 721.

(3) How much must be added to 6163443 to make 7986 × 897.

(4) Write in Roman notation 1891, 3858, 979, 445.

(5) Write in words 2013, 10876, 62734.

(6) A lot cost $360, the house on it cost 4 times as much as the lot less $126. Find the cost of both together.

(7) Find the sum, the difference, the product, the quotient, of 222642 and 279.

(8) Find the total cost of the following:—6 lbs. of tea at 68 cents a lb., 208 lbs. of sugar at 8 cents a lb., 76 yards of cloth at $1.25 a yard, 29 hats at 83 cents each.

(9) A cow is worth $40, a sheep $8, and a horse is worth $170. How many cows are worth as much as 8 horses and 15 sheep?

(10) Define Addends, Subtrahend, Multiplicand, and Dividend.

NORFOLK, 1891.

(1) Write each of the following numbers in figures; find their sum and express it in words: Fifteen thousand, six hundred and five; two hundred and seventy-one; six thousand and eighty-two; fifty-nine; twenty-six thousand, four hundred and eighty-three.

(2) Find the sum of all the odd numbers between 50 and 100.

(3) How much is the difference between 61453 and 36907 less than their sum?

(4) If a sack contained 3,629 apples, how many sacks of the same size could be filled from trees that bore 268,546 apples?

(5) Write in figures XLVII. and XXIX.; find their product, and write the result in Roman notation.

(6) A girl bought a pair of gloves for 75 cents, and a collar for 52 cents; she gave the store-keeper a $5 bill in payment. How many cents should she get back?

(7) Find the total value of the following articles:—25 lbs. of sugar at 6 cents a lb., 36 lbs. of tea at 50 cents a lb., 74 lbs. of coffee at 48 cents a lb., 63 lbs. of raisins at 12 cents a lb., 38 lbs. of currants at 9 cents a lb., 49 lbs. of biscuits at 11 cents a lb.

(8) A farmer sold 6 loads of wheat, each load containing 44 bushels, at 98 cents a bushel, and with the money received he bought a cutter at $26, a cow at $58, and 6 cords of wood at $4.25 a cord. How much money had he left?

DURHAM, 1891.

(1) Find the sum of all the numbers from 897 to 910 inclusive.

(2) Multiply 896437 by 9070.

(3) Divide 3467589 by 139.

(4) Simplify 9387 – 89 + 157 – 250 – 289 + 308 – 173.

(5) A man earns $847 a year, and spends $649 of it. How long will it take him to save $4554 from his earnings?

(6) In how many days will 92 men do as much work as 36 men can do in 46 days.

(7) How many days has a boy lived who is 8 years, 47 weeks and 5 days old, counting 365 days in each year.

(8) The difference of two numbers is 78; the larger number is 847; find the product of the two numbers.

(9) What shall I have to pay for 87 lbs. of tea at 67 cents a lb., 46 lbs. of sugar at 9 cents a lb., and 47 yards of cloth at $1.60 a yard?

(10) A boy was told to divide 98549 by 289, and gave as his answer 338. How much did his answer differ from the correct answer?

DUNDAS, STORMONT AND GLENGARRY, 1891.

(1) Write down in figures nine hundred and one thousand and twenty. Express in words 6040, 80905 and 110600.

(2) How much greater is 70506085 than 9849678? After working this example write after each line of figures its name.

(3) Write down and add together all the numbers between 8976 and 8982. After working this example write the name of the last line of figures.

(4) Find 9 times 89067. After working this example write after each line its name.

(5) Find 38 times 67954, and 1006 times 40680.

(6) How many sevens are there in 86492? After working this example write after each line its name.

(7) How many times will 49 go into 80659, and how much will be over?

(8) A man exchanges 34 cows worth $35 each for 13 horses worth $87 each. Does he give or receive any money to balance the trade, and if so, how much?

(9) How much will 45 bushels of wheat cost at $1.25 a bushel?

(10) If there are 184 pages in your Second Reader, and there are 26 lines on a page, and 35 letters in a line, how many letters would there be altogether in the book?

(11) If a boy gets 3 cents a bushel for picking up potatoes, how many bushels must he pick up to get $1.15 in money and a bushel of potatoes, allowing potatoes to be worth 35 cents a bushel?

(12) A girl can pick 8 quarts of berries in a day, and the berries are worth 10 cents a quart. How many days will it take her to earn $4?

(13) A man gets 6 bills from the bank which are together worth $100. Two of the bills are worth $10 each. If the remaining bills are equal in value, what is the value of each?

EAST MIDDLESEX, 1891.

(1) Add the lines horizontally and vertically.

386	989	687	
478	376	439	
369	488	968	

(2) Find how often 19376 is contained in 97098:
  (*a*) Do this by division.
  (*b*) Do it again by subtraction.
  (*c*) Show how the quotient in (*a*) can be found by the subtraction in (*b*).

(3) (*a*) Write in figures ninety thousand and fourteen.
  (*b*) Write in words 70208, and MDCIX.

(4) Will has 2 marbles more than Tom, but 11 less than Harry. who has 30; Dick has 3 times as many as Tom. How many has Dick?

(5) Jane had 22 small apples, and Ellen 13 large red ones. Jane gave 7 to Ellen for 4 of her red ones. How many more apples has Jane now than Ellen?

(6) Mr. M. bought 195 bushels of wheat for $173.55, and sold it for 7 cents a bushel more than it cost.
  (*a*) How much a bushel did Mr. M. sell it for?
  (*b*) How much money did he get for it?

(7) Divide 2867395421 by 42, using factors.

(8) It cost $538772 to make 169 miles of a railway. What was the cost of 1 mile?

(9) Make a bill of the items for a woollen dress as follows:— 9 yards of cloth at 63 cents a yard, 7 yards of lining at 13 cents a yard, 7 yards of triming at 39 cents a yard, 4 yards of braid at 3 cents a yard, 2 dozen buttons at 28 cents a dozen. And $5.60 for making.

PRESCOTT AND RUSSELL, 1890.

(1) Find the sum of 3750, 86942, 5309, 19, 758, 3495, and 200.

(2) Find the difference between one and one million.

(3) Write out neatly and correctly "7 times" and "9 times."

(4) How often is one hundred and sixty contained in the product of seven hundred and eight, and thirty thousand and twenty?

(5) When seven equal numbers are added, the sum is 1617. Find one of these numbers.

(6) In a class composed of 3 boys and 5 girls, each boy has 5 cents, and each girl has twice as much. How much have they all together, and how many apples can they pay for with all the money at the rate of 3 apples for 5 cents?

(7) Two men travelling at rates of 3 and 4 miles per hour continue their journey for 12 days. They travel from 6 o'clock in the morning until 6 o'clock in the evening, resting one hour at noon. How far will they be apart at the end of the twelfth day?

(8) If I sow 3 bushels of oats to the acre, and grow 420 bushels on a 7 acre field, how many bushels have I for each bushel sown?

(9) How many lbs. of sugar at 9 cents a lb. must a grocer sell to gain $13.50, the cost price of the sugar being 6 cents a lb.?

(10) In multiplying 329 by 78 I make a mistake by saying "seven times nine are eighty-one." How much must I subtract from my answer to get the correct result?

PRACTICE TABLE.

NO.	TABLE I.	NO.	TABLE II.
1.	242,022	1.	8,448,646,446
2.	442,202	2.	6,688,286,466
3.	442,200	3.	868,424,246
4.	240,220	4.	606,486,644
5.	402,222	5.	428,664,246
6.	331,110	6.	75,351,535
7.	303,211	7.	73,735,353
8.	311,121	8.	53,533,353
9.	342,221	9.	53,131,533
10.	221,121	10.	33,713,555
11.	550,112	11.	29,036,632
12.	404,201	12.	19,241,747
13.	040,121	13.	9,866,474
14.	443,121	14.	9,673,342
15.	552,232	15.	9,477,773
16.	243,110	16.	8,347,544
17.	152,231	17.	887,744
18.	435,112	18.	347,654
19.	543,121	19.	281,263
20.	402,301	20.	187,602

EXPLANATION OF THE TABLES.

Table I. contains no digit higher than 5, and therefore its use can be begun early.

ADDITION.

Exercise I.—20 examples, 4 addends each.

Example 1.—Copy four numbers, beginning with the *first* number of Table I.

Example 2.—Copy four numbers, beginning with the *second* number of Table I.

Example 3.—Copy four numbers, beginning with the *third* number of Table I.

Example 4.—Copy four numbers, etc.

When the 18th example is reached complete from the top, thus, the 18th, 19th, 20th and 1st. The 19th example will be composed of the 19th, 20th, 1st and 2nd.

In subsequent exercises the same method of procedure is to be adopted whenever there may not be enough addends to complete.

Exercise II.—20 examples, 5 addends each.
" III.— " 6 " "
" IV.— " 7 " "
" V.— " 8 " "

The following addition exercises, the addends are taken from the second table, using only the *thousands*' and *units*' digits. The extra figures of the table are given only for parctice in notation.

Exercise VI.—20 examples, 2 addends each.
" VII.— " 3 " "
" VIII.— " 4 " "
" IX.— " 5 " "
" X.— " 6 " "

SUBTRACTION.—TABLE I.

Exercise I.—**579,438** minuend, 20 examples.

Example 1.—Subtract the *first* number in Table I. from the given minuend.

Example 2.—Subtract the *second* number in Table I. from the given minuend.

Example 3.—Subtract the *third* number in Table I. from the given minuend, and so on. Thus

579438	579438	579438	579438
242022	442202	442200	240220
337,416	137,236	137,238	339,218

Exercise II.—**885,973** minuend, 20 examples.
“ III.—**868,943** minuend, “

SUBTRACTION.—TABLE II.

Using only the *thousands'* and *units'* periods.

Exercise IV.—**908,191** minuend, 20 examples.
“ V.—**809,081** “ “
“ VI.—**908,080** “ “
“ VII.—**944,444** “ “
“ VIII.—**955,555** “ “
“ IX.—**966,666** “ “
“ X.—**977,777** “ “

MULTIPLICATION.—TABLE I.

Exercise I.—**2** multiplier, 20 examples.
“ II.—**3** “ “
“ III.—**4** “ “

MULTIPLICATION.—TABLE II.

Using only the *thousands'* and *units'* periods.

Exercise IV.—**2** multiplier, 20 examples.
“ V.—**3** “ “
“ VI.—**4** “ “
“ VII.—**5** “ “
“ VIII.—**6** “ “
“ IX.—**7** “ “
“ X.—**8** “ “

DIVISION.—TABLE I.

Exercise I.—**2** divisor, 20 examples.
“ II.—**3** “ “
“ III.—**4** “ “
“ IV.—**5** “ “
“ V.—**6** “ “
“ VI.—**7** “ “
“ VII.—**8** “ “
“ VIII.—**9** “ “

PART II.—THIRD BOOK.

I.—Promiscuous Examples on Four Simple Rules.

(1) What will three dozen bananas cost at 3 for 10 cents?

(2) How much would be left out of a four dollar bill after paying for 6 five-cent stamps, 13 three-cent stamps, 12 two-cent stamps, and 9 one-cent postal cards?

(3) How many feet are there in 1 mile, if 42 miles contain 221,760 feet?

(4) At the rate of 25 cents a dozen, find the cost of 24,672 lead pencils.

(5) A man's wages are $40 a month, but his expenses are $15 per month. How long will it take him to pay for a house and lot which cost him $875, and a horse and buggy which cost him $325?

(6) Mr. J. went to town with 51 bushels of wheat, and farmer Brown went with a load of oats of the same weight. How many bushels of oats had Mr. Brown?

(7) A farmer has four fields, each containing 8 acres. If the fields yield 25 bushels per acre, how many bushels of grain will he raise off them?

(8) A person bought 7 yards of cloth @ 90 cents a yard, and 6 pounds of tea @ 35 cents per pound. How much change should be given out of two $5 bills?

(9) A farmer sold 12 head of cattle and 5 horses for $1,045. He received $125 each for the horses. How much per head did he receive for the cattle?

(10) A dealer bought 55 lambs at $2.25 each, and sold the whole so as to gain $41.25. How much did he get for each?

(11) The remainder is 43, the divisor 79, and the quotient one hundred and three thousand, two hundred and forty-nine. Find the dividend.

(12) A man bought three horses for $623. For the first he paid $123, for the third $42 more than for the first. Find the cost of the second.

(13) How much would be the cost of 60 apples at 5 for 3 cents, 24 peaches at 3 for 4 cents, and 36 pears at 2 for 3 cents?

(14) How much will two dozen of pears cost @ 3 for 5 cents?

(15) Fred has 75 cents. He bought three dozen oranges and had 3 cents left. How much were the oranges each?

(16) The wages of 13 men for one week is $97.50. How much did a man earn in a day?

(17) A chain is 66 feet long; a mile is 5,280 feet long, and a yard is 3 feet long. Find the number of chains in 5 miles and 66 yards.

(18) Find the total cost of 29 lambs at $5.20 each, 79 cows at $34.95 each, and 18 horses at $114.72 each.

(19) If a man bought oxen at $40 each and sold them at $48 each, how many did he have to clear $168?

(20) Mr. J. died, leaving property worth $4,500, to be divided equally among his three sons and two daughters. What was the share of each?

(21) The sum of two numbers is 3,475, and the smaller is 1162. What is the greater?

(22) What number must be multiplied by 124 to produce 40,796?

(23) The sum of $19,125 is to be distributed equally among a certain number of men. If each man receive $425, how many men were there?

(24) We have 90 chests into which to bestow 7,650 lbs. of tea. How many lbs. is there for each chest?

(25) Bought 156 barrels of flour for $1,248, and sold the same at $9 a barrel. Find gain.

(26) A farmer sold 4 tons of hay @ $12, 80 bush. of wheat @ $1, and takes in payment a horse worth $65, a wagon worth $40, and the rest in cash. How much money did he receive?

(27) The distance round the earth is roughly stated at 25,000 miles. How long would it take a man to make the journey round the earth, supposing him to travel at the rate of 35 miles an hour?

(28) The salary of the Governor-General of Canada is $50,000 a year. What could be his daily expenses to have $5,000 clear at the end of the year?

(29) A grain dealer bought 512 barrels of flour for $3,584, and sold the same for $4,608. Find his gain per barrel.

(30) A drover purchased 15 cows. 9 of them he sold for $35 each, and the remainder at $32 each, losing on the sale $123. What is the cost of each?

(31) A clerk's salary is $800 a year, and his expenses $425. How many years will elapse before he will have $10,000, if he is worth $2,500 at the present time?

(32) A farmer sold his market produce for $21.75. He paid for sugar $3.85, for tea $1.25, for coffee $2.50, for spices $2.50. How much money did he bring home?

(33) I owe *A* $37.06; *B*, $100; *C*, $500.85; *D*, $236.75, and *E*, $124.34. My property is worth $889.25. How much do I owe more than I am worth?

(34) I bought 143 pounds of coffee at 23 cents a pound. After paying $12.60, what was due?

(35) On a debt of $500, I receive 435 bushels of wheat at $1.05 per bush. What part of the debt is still unpaid?

(36) A youmg man on a salary of $500 finds his daily expenses to be 65 cents. How much does he save?

(37) Bought 4 pieces of cambric, each containing 19 yards, at 23 cents a yard. Find cost?

(38) A piece of work is undertaken by 25 men for $2,000. They incur $163.75 expense. What is each man's share of the profits?

(39) If 108 equal lots cost $5,711.04, how many lots would $1,322 buy?

(40) If 3,160 barrels of pork cost $48,032, how many barrels can be bought for $1,170.40?

(41) If 4,129 barrels of flour cost $26,219.15, how much will 360 barrels cost?

(42) A congregation intends to build a church, which is to cost $12,000. The collections already made are $524, $726, $1,837, $1,632, $2,439. How much is lacking?

(43) Mr. Brown earns $28 while Mr. Black earns $15. How much will Mr. Brown earn while Mr. Black earns $105?

(44) How many times will a cart wheel, 16 feet in circumference, revolve in going a mile (5,280 feet)?

(45) How many square blocks, 6 inches long and 4 inches wide, can be placed on a table 72 inches long and 48 inches wide, if the pile is 30 blocks high?

(46) If I gave 153 barrels of flour, worth $6 a barrel, in exchange for 54 acres of land, what is the price per acre of the land?

(47) How many blocks measuring 1 inch each way, could be cut from a block of soap 12 inches each way?

(48) A planter sold 40 bales of cotton at $68 a bale. With the proceeds he bought 8 horses at $180 each, and with the remainder bought cows at $32 a head. How many cows did he purchase?

(49) An estate was divided among 4 children. The first received $5,740; the second, $7,384; the third, $2,380 less than the second; and the fourth, $1,236 more than the first. What was the value of the estate?

(50) A man bought a horse for $115, and after keeping him 3 months, sold him for $155. If he paid $30 for his keeping, and received $50 for the use of him during that time, how much did he gain?

II.—Long Measure.

(1) Reduce 5 m. 18 rds. 4 yds. to yards.
(2) " 15 m. 8 rds. 5 yds. 3 ft. 4 in. to inches.
(3) " 7 m. 240 rds. to rods.
(4) " 3 m. 7 furs. 25 rds. to yards.
(5) " 3,875,240 inches to miles.

(6) A man sold a piece of wire 36,828 inches long. How many rods was it in length?

(7) Express 65,448 inches in terms of higher denomination.

(8) The diameter of the earth is 7,912 miles. How many feet in it?

(9) The length of a sounding line is 385 fathoms. Express the same length in rods.

(10) How many feet in 1 mile? How many inches? How many yards?

III.—Square Measure.

(1) How many square inches in a board 8 inches by 6 inches? Show this by a drawing.

(2) In one square mile how many acres? In a piece of land two miles square how many acres? Show the latter by a drawing.

(3) How many square yards in a ceiling 21 feet by 24 feet? Show this by a drawing.

(4) What is the difference between 10 square feet, and 10 feet square. Show this by a drawing.

(5) How many square yards in a floor 18 feet by 23 feet?

(6) What will be the cost of plastering a ceiling, 21 feet by 27 feet, at 15 cents per square yard?

(7) A gentleman sold 10 acres of land, and he was to receive 10 cents for every square yard. What did he receive for the land?

(8) Have a room 15 feet by 18 feet, and 12 feet high. How many square yards of plastering in the walls? in the ceiling? in the whole? Find cost at 35 cents per square yard.

(9) A lot, 40 rods long and 30 rods wide, contains how many acres? If it were 80 rods long by 165 yards wide, how many acres?

(10) A lot containing 10 acres is 40 rods long. How wide is it? Find the cost of fencing at $1.30 per rod.

IV.—Cubic Measure.

(1) How many cubic inches are there in 2 cubic feet? in 3 cubic feet? in 15 cubic feet? in 32 cubic feet?

(2) How many cubic feet are there in 3 cubic yards? in 5 cubic yards? in 15 cubic yards? in 24 cubic yards?

(3) How many cubic feet in a rectangular solid, 8 feet long, 5 feet wide, and 2 feet thick?

(4) In digging a cellar 24 feet long, 15 feet wide, and 6 feet deep, how many cubic feet of earth is removed? how many cubic yards?

(5) How many cubic yards in a cellar 21 feet long, 15 feet wide, and 6 feet deep?

(6) How many cords of wood in a pile 28 feet long, 4 feet wide, and 6 feet high.

(7) What will be the cost of digging a cellar with a capacity of 5,481 cubic feet at $.25 a cubic yard?

(8) What will be the cost of digging a cellar 24 feet long, 15 feet wide, and 9 feet deep, @ $1.25 per cubic yard?

(9) A man sawed a pile of wood 40 feet long, 4 feet wide, and 6 feet high at $1.00 per cord. What did he earn?

(10) How many bricks will be required to build a wall 42 feet long, 12 feet high, and 2 feet thick, if 21 bricks with the mortar used makes a cubic foot of wall?

(11) A bin is 12 feet long, 6 feet wide, and 5 feet deep. How many cubic feet in it? How many cubic inches? If there are 2,218 cubic inches in one bushel, how many bushels will the bin hold?

V.—Avoirdupois Weight.

(1) How many lbs. in 5 cwts.? 6 cwts.? 1 ton? 4 tons? 5 tons, 6 cwts., 75 lbs.? 13 tons 17 cwts. 83 lbs.?

(2) How many ounces in 25 tons? 13 tons? 17 cwts.? 3 tons 5 cwts.? 13 tons 17 cwts. 83 lbs.?

(3) What will 5 lbs. 7 ozs. of candy cost at 2 cents per ounce?

(4) If an ounce of sugar cost 1 cent, what will 6 tons 17 cwts. 48 lbs. cost?

(5) How many more lbs. in 150 long tons than in 150 ordinary tons?

(6) A merchant sold 5 cwts. 67 lbs. of cheese at 17 cents per lb. What did he receive for it?

(7) How many balls weighing ¼ of a lb. (= 4 ozs.) each, can be made from 1½ cwts. of lead?

(8) I buy 13 cwts. 76 lbs. of cheese for $214, and sell it at 20 cents a lb. Find my gain.

(9) If the weight of a bushel of wheat is 60 lbs., how many bushels are there in 3 tons 4 cwts. 20 lbs.?

(10) Bought flour at $9 per barrel, and sold it at $5 per cwt. (=5c. per lb.) Find profit on 18 barrels.

NOTE.—A long ton = 2,240 lbs., is used in weighing coal at the pit's mouth. The cwt. of 112 lbs. is used in Great Britain. The following are general measures in common use: 1 firkin butter = 56 lbs.; 196 lbs. flour = 1 barrel; 200 lbs. beef or pork = 1 barrel; 280 lbs. salt (at the works) = 1 barrel.

VI.—Troy Weight.

Troy Weight is used in weighing gold, silver, and jewels. In weighing pearls and other jewels, the *carat* is the unit employed, and it is equal to four grains. The term *carat* is also used to express the fineness of gold, and means $\frac{1}{24}$ part. Thus coin gold is 22 *carats* fine, meaning that $\frac{22}{24}$ parts is pure gold, and $\frac{2}{24}$ parts alloy.

(1) How many grains are there in 3 pennyweights? 11 ounces? 16 pounds? 7 ozs. 5 dwts. 18 grs.?

(2) What will be the value of an ornament weighing 2 ozs. 15 dwts., at $1.35 per dwt.?

(3) How many spoons, weighing 3 ounces each, can be made from 12 lbs. 9 ozs. of silver?

(4) How many spoons, each weighing 2 ounces, can be made from 3 lbs. 8 ozs.?

(5) What is the value of a gold bracelet, weighing 1 oz. 15 dwts., at $20 an ounce?

(6) What is 5 lbs. 9 ozs. 14 dwts. of gold dust worth at $.75 a pennyweight?

(7) How many carats in four stones weighing 1 dwt., 18 grs., 8 grs., 14 grs.?

(8) Find the value of a gold pitcher, weighing 4 lbs., at $18.75 per oz.

(9) From 7 lbs. 4 ozs. 8 dwts. of silver, how many spoons, weighing 34 dwts. each, can be made?

(10) A miner digs 40 dwts. of gold in one day, and 1½ ozs. the next. What is the value of his labor at $18.75 per oz.?

VII.—Dry Measure.

Used in measuring grain, roots, fruits, etc. In measuring grain, seeds, or small fruit the measure should be *even full.* In measuring large fruits, coarse vegetables, etc., the measure should be heaped.

A standard gallon contains 277¼ cubic inches, thus giving to the standard bushel 2,218 cubic inches.

(1) How many pints are there in 3 quarts? 5 quarts? 10 gallons? 5 bushels? 8 bushels? 3 bush. 2 pks. 1 gal.?

(2) How many cubic inches are there in 8 bushels? 12 bushels? 16 bushels?

(3) How many bushels are there in 22,180 cubic inches? 33,270 cubic inches? 55,450 cubic inches?

(4) How many quart boxes of berries could be filled from a basket containing 2 bush. 3 pks. 1 gal.?

(5) Bought 3 bushels of chestnuts at $2.50 per bushel, and sold them at 10 cents a quart. Find gain.

(6) At $3.20 a bushel, how many quarts of hickory nuts could be bought for $8.00?

(7) If 5 bushels of peaches be sold for $8.00, what price per quart is obtained for them?

(8) How long should 36 bushels of oats last a horse which receives 12 quarts per day?

(9) 50 bushels of potatoes are bought at 80 cents a bushel and are retailed at 15 cents a half-peck. Find gain.

(10) How many more pints in 20 bushels of oats than in 20 gallons of milk?

VIII.—Liquid Measure.

Used in measuring liquids. The standard or *imperial* gallon contains 277¼ cubic inches. The *wine* gallon of 231 cubic inches is no longer in use in Canada. In determining the capacity of cisterns or such receptacles, 31½ gallons may be considered a barrel. In commerce, however, barrels and hogsheads vary in capacity—generally having the capacity branded on the head.

(1) How many pints in 4 quarts? 2 gallons? 12 quarts? 10 gallons? 18 gallons, 3 quarts?

(2) How many gallons in 88 pints? 104 pints? 1,088 pints? 152 quarts? 784 quarts?

(3) How many gallons in 848 pints of milk? What is its value at 20 cents a gallon?

(4) How many cubic inches in 8 gallons? 10 gallons? 116 gallons? 360 gallons?

(5) How many gallons in 3,327 cubic inches? 5,545 cubic inches? 9,981 cubic inches? 16,635 cubic inches?

(6) How many pint bottles can be filled from a barrel of ale?

(7) What should be the cost of 46 gallons 1 quart of vinegar at 5 cents per quart?

(8) $12 was paid for a barrel of molasses, which was retailed at 20 cents a quart. Find the gain.

(9) Find to the nearest barrel how many barrels of water a tank will hold that is 12 feet long, 8 feet wide, and 6 feet deep.

(10) How many bottles of porter, each containing 1 quart 1 pint, could be filled from 136 gallons 2 quarts of the liquor, and find its value at 25 cents a bottle?

IX.—Time.

(1) How many seconds in 5 minutes? 6 minutes? 2 hours? 10 hours? 1 day? 1 week? 5 hrs. 15 min. 12 sec.?

(2) How many days in 604,800 seconds? 36,000 minutes? 5 weeks?

(3) How many days are there from March 15th to October 9th, both days inclusive?

(4) How many minutes in 5 years of 365 days each?

(5) If a clock ticks seconds, how many times would it tick in February, 1891? in February, 1892?

(6) How many minutes from May 1st to October 3rd, both days inclusive?

(7) A certain banker has an income of 10 cents a minute, what is that for a year?

(8) How many days in the present year?

(9) After $6\frac{1}{4}$ hours of the day has passed, how many minutes more remain to work in a 10-hour day?

(10) A clock loses 2 seconds each hour. What time is lost during the month of June? What time will the clock show on the 30th, at midnight, true time?

X.—English Money.

Also called Sterling money, is the style used for money calculation in Great Britain, India, Australia, The Cape, and in the leading British possessions except Canada, where the American system was adopted in 1859. The English shilling is worth $24\frac{1}{3}$ cents; the pound, $\$4.86\frac{2}{3}$; the guinea is a gold coin worth 21 shillings.

(1) How many farthings in 10 pence? 3 shillings? £4?

(2) How many pence in 18 shillings? £15? 30 guineas?

(3) Express 192,276 pence as guineas.

(4) Express in cents 1 shilling, 3 shillings, £1, £15, 1 guinea.

(5) What is the difference, in shillings, between £200 and 200 guineas? What is the difference in cents?

(6) A man having 125 guineas wishes to exchange them for crowns. How many should he receive? (1 crown = 5 shillings.)

(7) Bought from a cotton merchant of Manchester 240 yards of dress goods at 1 shilling 3 pence per yard. How much in Canadian money does it cost me?

(8) To a London produce dealer was sold 438 bushels of wheat at 90 cents a bushel. How much in English money was the bill?

(9) How many guineas in £21? in £315?

(10) How many farthings in £15 3s. 9d. + 12 guineas + 10 gs. 12s. 6½d.?

XI.—Miscellaneous Tables.

(1) A man is 3 score and 10 years old. Express his age in years.

(2) How many units in 5 doz.? in 1 gross? in 5 gross? in 3 gross 5 doz.?

(3) Find the cost of 10 gross of screws @ 6 cents a dozen.

(4) What is the cost of 15 dozen brooms @ 16½ cents each?

(5) What should I receive for 3 reams of paper @ 15 cents a quire?

(6) What is the bill for 8 gross of pens @ 5 cents a dozen?

(7) In 120,384 pens how many boxes of 1 gross each?

(8) How many buttons can be purchased for $5, @ 25 cents a dozen?

(9) If a box of pens be bought @ 85 cents, and be sold for a cent for each pen, find the gain on 3 dozen boxes.

(10) If a binder staple 30 dozen books in a day, how many gross could he staple in a year exclusive of Sundays?

XII.—Articles Sold by the 100 or 1,000.

Find the cost of—

(1) 8,250 lath @ $2.75 per M.

(2) 18,640 feet of plank @ $50 per M.

(3) 535,700 bricks @ $6.25 per M.
(4) 2,700 pineapples @ $12½ per 100.
(5) 5,690 envelopes @ $3.50 per M.
(6) 3,425 lbs. of rice @ $3.25 per cwt.
(7) 45,600 shingles @ $4.50 per M.
(8) 862 feet of siding @ $2.25 per 100.
(9) 1,862 lbs. of hay @ $.70 per cwt.
(10) 786 buttons @ $15.65 per M.

XIII.—Promiscuous Examples in Reduction.

(1) If I put 91 bushels of wheat into bags, each containing 3 bushels 2 pecks, how many bags will be required?

(2) How many cheeses, each weighing 9 lbs. 15 oz., would be required to make 44 cwts. 52 lbs. of cheese?

(3) How many lots of 1 acre 41 sq. rds. each, can be obtained from 16 acres 53 sq. rds.?

(4) How many times will a wheel, 16 ft. 6 in. in circumference, turn round in a distance of 84 miles?

(5) What is the cost of 3 miles of telegraph wire at 6 cents per foot?

(6) The township of Wawanosh is 12 miles square. How many 160-acre farms could be laid out?

(7) How many cubic yards of earth must be removed in making a fish-pond 120 feet long, 54 feet wide, and 5 feet deep?

(8) What will it cost to paint the ceiling of a room, 18 feet square, at 50 cents per square yard?

(9) If a ship sail 8 miles an hour, how many miles will it sail in 3 weeks 2 days 3 hours?

(10) How many dozen jars, each jar holding 3 qts. 1 pt., can be filled from 63 gallons of cider?

(11) A dealer bought 40 barrels of flour at $3 a hundred, and sold it for $5 a hundred. How much did he gain?

(12) A horse is fed a peck of oats daily. At 44 cents a bushel, what does his oats cost for a year of 365 days?

(13) A merchant wishes to ship 570 bushels of flax-seed in casks containing 7 bush. 2 pks. each. What number of casks is needed?

(14) How many bricks, 8 inches by 4 inches, would be needed to pave a court yard 120 feet by 90 feet?

(15) A grocer bought 10 barrels of pork at $14 a barrel, and retailed it at 10 cents a lb. Find the gain?

(16) A half-acre lot is 10 rods long. A 5-strand wire fence is put around it. Find the cost of the wire at 5 cents a pound, if 2 yards weigh 3 pounds.

(17) From a cube of 2 feet each way, how many small cubes, 1 inch each way, can be cut, allowing no waste in cutting?

(18) A solid pile of bricks is 14 feet long, 8 feet wide, and 12 feet high. How many bricks are there in the pile, each brick being 8 inches long, 4 inches wide, and 2 inches thick?

(19) Find the cost of 126 gallons of wine at 25 cents a pint.

(20) A human heart beats 70 times a minute. How many times will it beat in a week?

(21) How many kegs, of 4 gals. 3 qts. 1 pt. each, can be filled from 117 gallons?

(22) If a family use 7 lbs. 10 ozs. of sugar weekly, how long will 6 cwts. 10 lbs. last them?

(23) One cubic foot of water weighs 1,000 ounces. Express in lbs. the weight of 10 cubic feet.

(24) A bushel of superior wheat turns out 49 lbs. of flour. How many barrels could be made from 600 bushels of wheat?

(25) Bought 8 casks of wine, each containing 36 gals. 3 qts., at $.15 a pint. Find the cost.

XIV.—Factors.

(1) Arrange in a column all the numbers from 1 to 25, and opposite each number write all the *pairs* of factors that when multiplied will produce it.

(2) Arrange in a similar column the numbers from 26 to 50, and write their factors in the same way.

(3) Make a list of numbers from 1 to 120 that have 2 for one or more of the factors. Observe that the right hand figure of each is —, —, —, —, or —.

(4) 5 for one or more of the factors. Observe that the right hand figure is —, or —.

(5) 3 for one or more of the factors. Add the digits, and divide their sum by 3. Notice your remainder if any.

(6) 9 for one or more of the factors. Add the digits, and divide the sum by 9. Notice the remainder if any.

(7) From your observation of the preceding questions, state how you know when a number is divisible by 2, by 3, by 5, by 9.

(8) Of the following numbers, select those that are divisible by 2, by 3, by 5, by 9:—342, 963, 360, 843, 1116, 5820, 765, 465, 846, 9624.

(9) Change one figure in each of the following numbers so as to make the number divisible (*a*) by 2, (*b*) by 5:—4379, 5627, 8291, 6479, 8123, 4871, 5243, 2147, 9281, 4343, 4441, 5557, 7957, 8971, 3629.

(10) Change the last figure of each so that the number may then be divisible (*a*) by 2, (*b*) by 9.

XV.—Cancellation.

What is the quotient of—

(1) $42 \times 22 \times 3 \times 26$ divided by $13 \times 6 \times 7 \times 4$.

(2) $21 \times 5 \times 11 \times 24 \times 42$ divided by $20 \times 2 \times 22 \times 27$.

(3) $30 \times 49 \times 64 \times 25$ divided by $35 \times 15 \times 24$.

(4) $12 \times 60 \times 36 \times 35$ divided by $7 \times 30 + 18 \times 24$.

(5) $\frac{15 \times 57 \times 36 \times 35}{12 \times 19 \times 25} =$

(6) $\frac{42 \times 18 \times 65 \times 11}{35 \times 45 \times 13} =$

(7) $\frac{91 \times 36 \times 94 \times 54}{78 \times 14 \times 18} =$

(8) Divide $34 \times 102 \times 85$ by $51 \times 17 \times 68$.

(9) Divide $16773 \times 13401 \times 11412$ by $11182 \times 11912 \times 8559$.

(10) At what price per yard will 5 bales of cloth, containing 12 pieces of 42 yards each, pay for 50 rolls of carpeting of 75 yards each, at $2.10 per yard.

XVI.—Factors.

Resolve into prime factors—

(1) 1050. (2) 1320. (3) 7000. (4) 2956. (5) 3430.
(6) 2992. (7) 1768. (8) 5432. (9) 1848. (10) 2625.

XVII.—Prime Factors.

What prime factors are common to—

(1) 60 and 90. (2) 72 and 84. (3) 54 and 90. (4) 80 and 100. (5) 84 and 126. (6) 52, 68 and 76. (7) 75, 125 and 175. (8) 42, 70 and 78. (9) 63, 99 and 117. (10) 33, 55, 77 and 121.

XVIII.—Highest Common Factor.

Having obtained from the preceding exercise the prime factors common to the numbers, now find:

(1)-(10) The *highest* factor common to the numbers of each question. How is it obtained?

XIX.—Highest Common Factor.

Find the H.C.F. of—

(1) 16, 24, 40. (2) 54, 81, 108. (3) 72, 108, 144, 180. (4) 72, 120, 132. (5) 75, 125, 165. (6) 64, 96, 112, 136. (7) 306, 408, 510. (8) 420, 462, 84. (9) 546, 462, 882. (10) 19782, 16485, 14287.

XX.—Highest Common Factor.

(1) A carpenter has 12 and 16-foot boards with which to build a sidewalk. How wide must the walk be to have no waste when the lumber is cut?

(2) Three boys have 25, 45, and 65 cents respectively, and not in one-cent pieces, yet the coins are all of the same denomination. What is it?

(3) In our school there are 258 boys and 301 girls. It is desirable to divide them into classes of equal numbers. How many pupils can be assigned to each class?

(4) We have to pave a court-yard, 28 feet 8 inches wide, and 44 feet 8 inches long, with square tile, of the greatest size possible. Find length of tile.

(5) A play-ground is 240 feet by 352 feet, and is about to be fenced. How long should the lumber be—the greatest possible—so that there may be no waste in cutting?

(6) I have 12 and 16-foot lumber with which to build a fence. How far apart must I place the posts so that I may not need to cut any of the boards?

(7) I have two numbers prime to each other. When multiplied by the same number they become 247 and 323. Find the multiplier: also the two prime numbers.

(8) Four gentlemen have respectively $190, $270, $310, and $490, and upon counting they find the bills are all of one denomination. Find the denomination of the bill.

(9) I buy an exact number of dollars' worth of sugar, and so does my neighbor. He gets 130 lbs., and I get 78 lbs. How many lbs. are given for a dollar?

(10) Four employers of labor pay $64, $96, $112, and $136 weekly to their employees. Each employee receives the same weekly sum. Find the weekly pay of a man.

XXI.—Highest Common Factor.

(1) The numbers 7955, 8769, and 6401, have a factor common to all three. Find that common factor.

(2) With my tape-line I measured off the distance 672 yards, 352 yards, and 992 yards. If the measurements were obtained by exact lengths of the line, and the line was the longest possible to give those numbers, what was the length of the line?

(3) When 721, 1207, and 1497 are all divided by a certain number there are remainders 91, 73, and 111 respectively. Find the divisor.

(4) 21, 27, and 35 are the remainders respectively when 483, 1791, 2597 are divided by a certain number. Find the number.

(5) It is desired to pave with the largest possible square paving stones sidewalks that are 56 inches, 72 inches, and 84 inches wide. Find the length of a side of the paving stone.

(6) Two journeys of 777 and 864 miles are portioned into equal daily distances. Find the daily journey.

(7) Two cisterns are of 4,672 and 5,088 gallons respectively. Find the largest barrel capable of measuring both cisterns.

(8) A farmer has two farms, 640 rods by 480 rods, and 680 rods by 560 rods respectively. He desires to lay them out in square fields of the largest side possible. Find the side in yards.

(9) I own a farm 2,541 feet long, and 2,189 feet wide. What is the longest rail that can be used for a straight rail fence to fence both sides, without cutting?

(10) I have three grades of sugar, 7,791 lbs., 4,197 lbs., and 5,859 lbs. respectively. I desire to order a bag that will exactly measure the three quantities. What should be the capacity of the bag?

XXII.—Least Common Multiple.

Find the L.C.M. of—

(1) 8, 12, 16, 24, 48.
(2) 16, 20, 24, 32, 40.
(3) 25, 40, 75, 80, 120.
(4) 32, 45, 70, 64, 90.
(5) 10, 24, 25, 32, 45.
(6) 16, 27, 42, 108.
(7) 13, 29, 52, 87.
(8) 14, 17, 105, 110.
(9) 9546, 6364, 14319.
(10) 4862, 2002, 17017.

XXIII.—Least Common Multiple.

(1) One boy's blocks are 2 inches thick, another's 3, and another's 5. The three boys build towers of equal heights. How high at least are they? How many blocks does each one use?

(2) *A* takes 27 inches at a step while *B* takes 30. How far must they walk together before both will be taking a step at the same instant?

(3) What is the least sum of money which can be paid with either 2, 3, 5, 10, 20, or 25-cent pieces?

(4) The travellers from a wholesale house are sent out together, to be gone 1, 2, 3, 4, 5 weeks respectively. When any one returns he is sent out for the same period as before. In how many weeks will they be together again?

(5) Had they been sent out for periods of 6, 9, 12, 18, and 36 weeks respectively, in how many weeks would they come in together?

(6) What is the least number of marbles that can be divided equally among 12, 18, and 24 boys?

(7) What is the least sum of money with which I can purchase an exact number of books at $3, $4, $5, $6, or $8 each?

(8) What is the least number of marbles which can be put up in bags holding 833, 1,071, 1,309, 1,785?

(9) A tailor has three pieces of tweed 15, 25, and 35 yards in length respectively. What should be the suit lengths that there may be no remnants?

(10) What must be the capacity of a cask which can be emptied exactly by measures of 3 pints; 1 quart; 2 quarts 1 pint; 3 quarts 1 pint; and 1 gallon?

XXIV.—Least Common Multiple.

(1) What is the least number which, when divided by 16, 18, 24, and 35, will leave 13 for a remainder in each case?

(2) Three boys run round a circular track. The first can make the circuit in 12 minutes, the second in 15 minutes, and the third in 18 minutes. After what time will all three be at the starting point together?

(3) What is the least number of lbs. of coffee at 37 cents a lb. that could be exchanged for an exact number of lbs. of tea at 65 cents a lb.?

(4) When a boy counts his marbles by 6's, 10's, or 12's he has 4 over, but when taken 16 at a time he has none over. What is the least number he can have?

(5) Find the least capacity of a cistern which could be exactly filled by a 30-gallon barrel, a 35-gallon barrel, or a 42-gallon barrel.

(6) What must be the least length of a box that it may contain books 4 inches long, 5 inches long, or 12 inches long?

(7) What is the least size of a farm that may be divided into 13-acre lots, 14-acre lots, or 21-acre lots?

(8) Find the least capacity of a cistern so that it could be filled in an exact number of minutes by each of three pipes which supply 42, 63, or 147 gallons per minute.

(9) The front and hind wheels of a carriage are 8 feet 4 inches, and 10 feet 10 inches in circumference respectively. How far must the carriage travel that both wheels may make an exact number of revolutions?

(10) One pound Troy is equal to 5,760 grains, while 7,000 grains make a pound Avoirdupois. What is the least weight in pounds Troy that is also an exact number of pounds Avoirdupois?

XXV.—Compound Addition.

	£.	s.	d.
(1)	17	3	6
	18	4	9
	17	11	6
	29	18	9
	16	11	3

	£.	s.	d.
(2)	145	0	9½
	169	17	8
	175	14	7¼
	166	15	8¾
	1199	5	10

	£.	s.	d.
(3)	487	12	1¼
	399	15	2½
	456	1	1¾
	798	19	3¼
	100	10	1

	tons	cwt.	lb.
(4)	55	16	42
	14	11	55
	63	19	99
	919	6	45
	89	1	79
	299	15	66

	cwt.	lb.	oz.	dr.
(5)	75	66	15	15
	94	81	6	11
	88	40	11	9
	3	49	10	11
	900	91	9	1
	44	45	2	15

	mi.	fur.	rd.	yd.
(6)	77	5	13	4
	186	3	10	2
	69	3	28	3
	771	2	29	2
	46	7	30	3
	175	1	26	1
		5	0	1

	sq. mi.	ac.	rds.	sq. rd.	sq. yd.
(7)	50	75	1	30	15
	791	11	2	15	11
	87	345	3	31	16
	75	473	1	29	30
	15	29	1	18	26

(8) A jeweller receives on one day 11 lb. 6 oz. of gold; on another day, 10 lb. 5 oz. 20 gr.; on the third day, 6 oz. 3 dwt. 16 gr.; on another, 5 lb. 17 dwt. 1 gr.; on a fifth, 16 lb. 4 oz. 15 dwt. 15 gr. How much does he receive in all?

(9) A miller bought four loads of grain containing respectively 25 bush. 3 pk., 28 bush. 2 pk., 32 bush. 3 pk. 5 qt., 28 bush. 2 pk. 7 qt. How much grain did he buy?

(10) A merchant sold the following quantities of molasses:—On June 15th, 24 gal. 2 qt. 3 pt.; June 16th, 45⅛ gal.; June 17th, 1¼ barrels. How much did he sell in that time?

XXVI.—Compound Subtraction.

	£.	*s.*	*d.*
(1)	173	8	5
	75	9	$7\frac{3}{4}$

	sq. rd.	sq. yd.	sq. ft.	sq. in.
(2)	35	14	6	81
	13	25	7	108

(3) From 14 yr. 2 dy. 20 hr. 31 min. 52 sec. take 9 yr. 1 wk. 6 dy. 23 hr. 56 min. 58 sec.

(4) From $\frac{3}{4}$ of an acre a piece containing 72 sq. rd. 160 sq. ft. 39 sq. in. was sold. How much was left?

(5) From a farm of 285 acres there were sold at one time 97 ac. 3 rd. 13 sq. rd. 10 sq. yd. 108 sq. in.; at another time, 38 ac. 39 sq. rd. 7 sq. yd. 5 sq. ft. 9 sq. in. Find remainder.

(6) A wagon loaded with hay weighs 32 cwt. 66 lb. The wagon alone weighs 8 cwt. 67 lb. What is the weight of the hay?

(7) It is 24,899 miles round the earth. After a man has travelled 100 mi. 41 rd., what distance still remains?

(8) If 2 bush. 1 pk. 1 qt. be taken from a bag containing 4 bushels of hickory nuts, what quantity will remain?

(9) From a 63-gallon cask of wine there leaked a quantity, leaving 51 gal. 1 qt. 2 gill. How much was lost?

(10) Magna Charta was signed June 15th, 1215; Mary Queen of Scots was beheaded February 8th, 1587. What lapse of time between those dates?

XXVII.—Compound Multiplication.

(1) A farm consists of 7 fields, each containing 18 ac. 25 sq. rd. How much land does it comprise?

(2) Find the length of a fence which encloses a square field, each side of which is 28 rd. 5 yd. 2 ft. 6 in. long.

(3) What will be the cost of 14 yards of lace at £2 5*s.* 6*d.* per yard?

(4) What is the value of 4 loads of potatoes, each containing 27 bush. 3 pk., at $.45 per bushel?

(5) How much water is contained in 96 hogsheads, each of 62 gal. 1 qt. 1 pt. 1 gill?

(6) If 1 silver spoon weighs 3 oz. 5 dwt. 15 gr., what is the weight of 10 dozen such spoons?

(7) A man travels 24 mi. 7 fur. 4 rd. in 1 day. How far could he travel in a month of 30 days?

(8) Find the total length of 36 pieces, if each piece contains 25 yd. 2 ft. 3 in.

(9) A steamer on the way to Australia from Liverpool averages for the first 13 days 324 mi. 7 fur. 27 rd. 3 yd. How far did the vessel steam in the 13 days?

(10) A cotton factor sold 425 bales of cotton, each weighing 4 cwt. 85 lb., for 13 cents a lb. He paid $24,735 for the cotton. How much did he gain?

XXVIII.—Compound Division.

(1) 65 bush. 1 pk. 3 qt. of wheat is contained in 12 sacks. What is the capacity of each sack?

(2) What is the cost of cloth per yard when 65 yards cost £72 14s.?

(3) In 30 days a traveller covers 746 mi. 5 fur. What is the daily journey?

(4) 7 miners are equal partners in 98 lb. 2 oz. 19 dwts. 5 gr. of silver. Find each man's share.

(5) A farmer reserves 40 ac. 40 sq. rd. out of his two farms of 104 ac. 117 sq. rd., and 87 ac. 78 sq. rd. respectively. The remainder he divides among his three sons. Find a son's share.

(6) A farmer's crop consisted of 5,000 bush. 3 pk. of corn one year, and 7,245 bush. 2 pk. the year following. He sold 8,022 bush. 1 pk., and placed the remainder in 8 cribs, each crib containing the same number of bushels. Find the capacity of a crib.

(7) A speculator bought 6 adjoining pieces of land, each containing 4 ac. 80 sq. rd. He divided the whole into 54 lots, and sold them at $5 a sq. rd. How much did he get for each lot?

(8) Add 35 lb. 9 oz., 75 lb. 14 oz., 85 lb. 15 oz.; from the sum take 186 lb. 14 oz.; multiply the remainder by 8; divide the product by 64. What is the result?

(9) How many sacks, each containing 3 bush. 3 pk. 1 gal. 3 qt., would be necessary to contain 309 bush. 2 pk. 2 qt.?

(10) How often is 4 ac. 54 sq. rd. contained in 69 ac. 64 sq. rd.?

XXIX.—Promiscuous Examples on the Compound Rules.

(1) A farmer has 18 fields, each of which contains 41 ac. 2 rood 11 sq. rd.; these are divided among his seven children. How much does each child receive?

(2) 168 bush. 1 pk. 1 gal. 2 qt. of wheat is divided among 35 men in the famine district of Russia. How much does each receive?

(3) There are 3 men, the sum of whose ages is 14 times 20 yr. 5 mo. 3 wk. 6 dy. If their ages be equal, find the age of each.

(4) In 63 barrels of sugar there are 7 ton 16 cwt. 3 qu. 12 lb. How much is there in each barrel?

(5) 352 men in one week ate 27 cwt. 1 qr. 5 lb. 12 oz. of bread. What was the daily ration of each man?

(6) 465 bush. 3 pk. 1 gal. 2 qt. of grain is to be put into 105 bags. What quantity goes into each?

(7) 59 casks contain 44 hhd. 53 gal. 2 qt. 1 pt. of wine. What did 5 of them contain?

(8) A lady bought a quantity of butter weighing 24 lbs. How many ounces are used per day, if the whole quantity lasts her family from the 1st of May to June 15th.

(9) How many pounds of butter can be made in 1 week from the milk of 12 cows, giving an average of 12 qt. 1 pt. each daily, if 25 quarts yield 1 lb. 8 oz. of butter?

(10) If a thousand cigars cost $85, what is the cost of 3 boxes of 50 cigars each? If a man smoke 3 cigars a day for a year, what is his cigar bill?

(11) A grocer bought a barrel of vinegar containing 123 quarts, at 12 cents a gallon, and paid for it with coffee at 37½ cents a lb. How many pounds of coffee was required?

(12) In multiplying a number of feet and inches by 3 and by 4, and adding the products we get 76 ft. 5 in. Find the number.

(13) The Thames River tunnel measures 3,960 yards in length. How many metres long is it, 35 yards being equal to 32 metres?

(14) If 7 gross of buttons cost £2 16*s.*, how much will 100 gross cost?

(15) A man lends his neighbor £135 6*s.* 8*d.*, and takes in part payment 4 cows, at £5 8*s.* each, and a horse worth £50. Find the balance then due.

(16) If a man travel 24 mi. 7 fur. 30 rd. in a day, how long will it take him to travel 201 mi. 6 fur. 18 rd.?

(17) A traveller has 246 mi. 6 fur. 36 rd. to travel in 12 days. After 9 days what distance still remains?

(18) A vessel arrives in port with a cargo of 50 hogsheads of sugar, each containing 1 ton 5 cwt. 3 qr.; 40 hogsheads, each containing 18 cwt. 2 qr. 12 lb.; and 75 hogsheads, each containing 15 cwt. 3 qr. 18 lb. 8 merchants buy the entire cargo. What amount of sugar belongs to each?

(19) A ship with a cargo of 250 bales of cotton, each weighing 12 cwt. 2 qr. 15 lb., was obliged in a storm to throw overboard 60 bales. The cotton was owned in equal shares by 5 merchants. What was the loss sustained by each, if the cotton was worth 25 cents a pound, and what quantity did each receive?

(20) A steamship in crossing the Atlantic, has a distance of 3,500 miles to go. If she can steam 423 mi. 1 fur. 24 rd. a day, after 7½ days what distance will she still have to sail?

(21) Find the cost, at $8.25 per thousand, of the brick necessary to pave a court-yard 180 feet by 120 feet, if the brick used have a face of 8 inches by 4 inches.

(22) A man left property to the amount of £1,718 9*s.* 6*d.* He divided this into 2 equal parts, one of which he gave to his wife, and the other part was divided equally among his three daughters. Find the share of the wife, and of a daughter.

(23) How many pieces of cloth, each containing 35 yards, will clothe a company of 48 men, if it takes 5 yd. 31½ in. for each man?

(24) Purchased a silver tea-pot, weighing 23 oz. 17 dwt. 11 gr.; a sugar-bowl, weighing 8 oz. 13 dwt. 19 gr.; a cream-pitcher, weighing 5 oz. 11 gr. Find weight of the whole.

(25) A printer uses one sheet of paper for every 16 pages. How much paper will be necessary to print 500 copies of a book containing 336 pages, allowing 2 quires of waste paper in each ream, the waste paper being counted only on the entire reams?

XXX.—Bills and Accounts.

(1) In commercial transactions what do the following contractions stand for:—Acct., a/c, am't., @, bal., Co., C.O.D., Cr., do., Dr., inst., Mdse., pay't., Rec'd.?

Copy carefully the following bills, and extend the amounts. For an exercise the ruling might be done in red ink.

(2) WINGHAM, March 31st, 1892.

Mr. James Clow, Sr.

Bought of *GORDON & McINTYRE.*

				$	c.
Feb.	7	3½ lbs. coffee	@ $.32		
	"	2 lbs. cream tartar . .	@ $.35		
	"	1 gal. malasses	@ $.76		
	"	2 bottles mixed pickles .	@ $.28		
	21	25 lbs. lump sugar . . .	@ $.07		
	"	½ barrel salt	@ $1.50		
Mar.	2	3 lbs. cheese	@ $.18		
	3	2 lbs. raisins	@ $.15		

Received payment,

GORDON & McINTYRE.

(3) GEORGETOWN, May 15th, 1892.

Mr. Alfred M. Laird

In account with *D. REID.*

				$	c.
Jan.	3	To 1 plow	$15.00		
"	"	" 2 extra plowshares . .	@ $1.50		
"	"	" 1½ lbs. powder . . .	@ $.85		
"	"	" 3 lbs. shot	@ $.11		
April	14	" 3 hoes	@ $.90		
"	"	" 5 rakes	@ $.95		
				$	
		Cr.			
Mar.	13	By 20 lbs. butter	@ $.13		
"	"	" 3 doz. eggs	@ $.18		
April	14	" 10 bush. potatoes	@ $.80		
		Balance . . .		$	

Received payment,

D. REID.

Rule in proper form, and make out the following bills :—

(4) Mr. James McGill bought from W. Kirkwood, Brampton, July 7th, 1 cheese-dish $.50, ½ doz. butter plates @ $1.50, 1½ doz. dinner plates @ $2.50 ; July 9th, lamp $.75 ; July 10th, 5 pitchers @ $.75, 1½ doz. cups and saucers @ $1.25, 1½ doz. forks @ $4.50, 1½ doz. knives @ $4.75. Date the bill August 1st, 1891, and receipt the bill.

(5) Mrs. A. B. Smith bought from E. P. Dale, Kingston, Feb. 5th, 1892, 2 cans beans @ $.10, ½ bush. potatoes @ $1, 2 lbs. tea @ $.60 ; Feb. 9th, 1 lb. cracknels $.20, I doz. eggs $.32, 7 lbs. Graham flour @ $.04 ; Feb. 16th, 3 cans tomatoes @ $.12, 4 lbs. prunes @ $.16, 1 doz. oranges $.50. Date bill March 1st, 1892, and receipt it as clerk for Mr. Dale.

(6) Wm. Robertson, Clinton, in account with H. Kerr, April 6th, repairing house as per contract $50 ; April 7th, 1½ hours labor @ $.32½, 12 feet clear lumber @ $.04, 2 lbs. nails @ $.05 ; April 8th, 10 hours' labor @ $.32½, 11 feet lumber @ $.03½, cartage $.25, 3 lbs. nails @ $.05. Date bill April 14th, and receipt it.

(7) Messrs. Risser & Co., Toronto, bought from the American Book Company, Boston, May 1st, 1892, 1 copy "Little Men," $1.35 ; 1 "Modern Explorers," $10 ; 1 "Three Vassar Girls in South America," $1.30 ; 1 "Rose in Bloom," and "Eigth Cousins," $2 ; 13 vols. Shakespeare @ $1 ; 3 vols. "Diamond Edition Poetry" @ $1.25 ; 6 vols. Hawthorne @ $1.35 ; 1 vol. "Sports and Pastimes for American Boys," $1.25.

PROMOTION EXAMINATION PAPERS.

THIRD TO FOURTH BOOK.

LANARK, 1891.

(1) What is the difference between square and cubic measure? How many tons of coal would a box 8 feet long, 7 feet wide, and 6 feet deep, hold? (42 cubic feet to the ton.)

(2) The product of four numbers is 33,066,912. The first number is 24, the second 29 more than the first, and the third is 134 less than 3 times the sum of the first and second. Find the fourth.

(3) How many building lots 90 feet by 56 feet, are in 9 acres 152 poles 2 yards?

(4) What will it cost for stone at $3.50 a cord, to build the foundation of a house 36 feet by 24 feet, the stonework to be 7 feet high, and 20 inches thick?

(5) Four hams weighed 122 lbs. The first weighed 4 lbs. less than the second, but 9 lbs. more than the third, which weighed 5 lbs. less than the fourth. Find the weight of each.

(6) A grocer mixed 40 lbs. of tea at 40 cents a lb., and 60 lbs. at 55 cents a lb., with 70 lbs. at 60 cents a lb. At what must he sell the mixture per lb. to gain $14.40?

(7) What is the difference between a common measure, and the greatest common measure? Find the G.C.M., and also the L.C.M., of 10,080, 16,100, 5,040, 6,720. No long division allowed.

(8) A farmer exchanged 70 bushels of rye at 92 cents a bushel, for 40 bushels of wheat at $1.37 a bushel, and received the balance in oats at 40 cents a bushel. How many bushels of oats did he get?

(9) If bricks are laid on their edge, how much will it cost to pave the floor of a cellar 12 feet square, bricks costing $6.50 per M.?

(10) If 47 horses cost $3,666, at how much must I sell 28 of them to gain $252 on those sold?

DURHAM, 1891.

(1) Define Rectangle, Perimeter, Multiple, Concrete Number.

(2) What is the average cost per pound of the following: 32 lbs. at 48 cents per lb., 28 lbs. at 24 cents per lb., 24 lbs. at 30 cents per lb., and 18 lbs. at 15 cents per lb.?

(3) Reduce 7,964,820 square inches to acres.

(4) At 2 cents a square foot, find the cost of fencing 1 mile of a railway track both sides, with a close board fence 4 feet high.

(5) What is the least number which, taken from 893 and 967 respectively, leaves remainders of which 7 is a measure?

(6) Find the (*a*) G.C.M. of 1,628, and 4,543.
(*b*) L.C.M. of 42, 52, 36, and 156.

(7) If $1,631 be divided between *A* and *B*, so that *B* receives $161 less than *A*, find how much *A* will receive.

(8) What is the least number which, divided by 16, by 18, or by 24, leaves in each case the remainder 7?

(9) What length of 2-inch plank, 16 inches wide, will contain 64 feet board measure?

(10) A man exchanges 14 bushels of wheat for 24 bushels of barley. When 12 bushels of wheat are worth $11.52, find the difference between the price of 7 bushels of wheat, and 7 bushels of barley.

HURON, 1891.

(1) Find the price of a load of oats weighing 1,534 lbs. at 51 cents per bushel.

(2) Find the price of 70½ lbs. of tea at 25½ cents per lb.

(3) A cheese factory received in one day the following weights of milk: 75, 178, 394, 28, 964, 1,264, 321, 436, 729, 936, 251, 1,049, 378, 419, 374, 536, 974, 179, 436, 364, 549, 296, 345, 745, 524, 342, 574, 386, 271, 78, 36, 42. These weights are in pounds. How many pounds were received?

(4) If it takes 9½ pounds of milk to make 1 pound of cheese, how many pounds of cheese should the quantity of milk in question (3) make?

(5) If milk be bought at 8 cents per gallon of 10 pounds, and cheese is sold at 11 cents per pound, find the day's profit in question (3). The cost of making a pound of cheese being 1 cent per pound.

(6) How many times in succession can 1,440 be subtracted from 8,235,460,874, and what will be the final remainder?

(7) How many days does a man work, who begins work on February 17th, and quits on December 19th, supposing him to work 7 days every week?

(8) My railway fare from Hamilton to Montreal at 3 cents a mile was $11.55. I returned by boat at 1 cent less a mile. What was my fare for the round trip?

(9) I have a coin, and on it is stamped MDCIV. In what year was it made?

(10) Find the average of 263, 425, 363, 29, 46, 120, 263, 428, 32, 95, 58, 64, 39, 425, 964, 384, 230.

NORTH HASTINGS, 1891.

(1) Define accurately in sentences the following terms:—Abstract number, debit side of an account, volume of a solid, improper fraction.

(2) Take a million inches from 110 miles. Answer in miles, rods, etc.

(3) The difference between the product of two numbers and 20,828 is seven hundred and nine thousand, five hundred and six. One of the numbers is 89. What is the other?

(4) *A*, *B*, and *C* bought city lots, paying cash for them. *A* furnished $1,800, *B* $1,500, and *C* $1,200 of the purchase money. They sold the lots for $8,424. How much did *C* gain?

(5) A man who owed me some money failed, and I lost $\frac{5}{8}$ of what he owed me. If I received $1,584.72, how much did he owe me at first?

(6) How many feet of lumber are there in 24 joists, 16 feet long, 10 inches wide, and 2 inches thick?

(7) How many shingles are required for the roof of a house, the roof being 36 feet long, and the rafters 20 feet long? Shingles to be laid 4 inches to the weather, and the usual allowance made for waste.

(8) What part of $\frac{1}{2}$ is $\frac{3}{8}$? Illustrate this by means of an oblong, and show the correct result without performing the operation with figures.

(9) Three planks measuring respectively 12 feet, 16 feet, and 20 feet in length, were cut into the largest possible pieces of equal

length. What was the length of each piece, and how many pieces were there?

(10) Write down the following statement of five week's cash receipts; add the amounts vertically and horizontally, and prove the correctness of the work by adding your results.

	MON.	TUES.	WED.	THURS.	FRI.	SAT.	TOTAL.
1st.	$28.79	$34.71	$35.33	$30.10	$27.97	$47.81	
2nd.	23.87	30.79	29.38	33.84	26.77	28.77	
3rd.	16.99	27.07	28.69	30.16	24.95	43.07	
4th.	29.13	33.72	30.81	39.97	28.47	50.05	
5th.	18.47	32.29	26.73	34.45	28.78	45.93	
TOTAL.							

GREY, 1891.

(1) How long must a pile of cord-wood, 48 feet wide and 8 feet high, be to contain 990 cords?

(3) What was the cost price per head of 600 horses that sold for $90,000, gaining $30 on each? How much would be gained or lost by selling them for $75,000?

(3) A stick of square timber, 20 inches by 12 inches, is 75 feet long. What is it worth at $12 per 1,000 feet (board measure)?

(4) 14 gallons of ink are made from materials that cost $4.50. If the ink be sold in 5-cent bottles of which there are 24 in a pint, what is the profit on the 14 gallons, if the bottles cost 1 cent each?

(5) How many sovereigns of 192 grains each, can be made from 400 lb. 16 oz. 8 dwt. of gold?

(6) What will it cost to carpet a room. 18 feet long, and 16 feet wide, with carpet 27 inches wide, at $1.25 a yard?

(7) A dealer bought 12 bushels of wheat at 90 cents a bushel, 7 bushels of barley at 55 cents a bushel, 4 bushels of oats at 30 cents a bushel, and 8 bushels of potatoes at 15 cents a bushel. Find (*a*) the average price per bushel, and (*b*) the number of bushels of corn at the average price that can be purchased for the money expended in the other grains.

(8) A gold digger found a nugget of gold weighing 30 pounds. He gave 2 lb. 11 oz. 10 dr. to the refiner for purifying it. The dross taken from it weighed 6 lb. 8 oz. 9 dr. He gave his father 3 times as much as he gave the refiner, and divided the remainder among his three sisters. How much did each sister receive?

(9) A sheet of paper, 18 inches by 34 inches, is cut from a larger sheet, leaving 612 square inches. What is the length of the larger sheet, if its breadth be 24 inches?

(10) Find the value of (6,728 × 8,276) + (48,689,838 × 98) + (4,024,156 ÷ 8,903) – (36,380,250 ÷ 125.)

WELLINGTON, 1891.

(1) A drover bought a certain number of cattle for $2,025. He then sold 17 of them for $918, gaining on what he sold $153. How many did he buy, and what did each cost him?

(2) A farmer had 300 bushels of wheat, and sold 25 bush. 3 pk. 1 gal. to one man, and twice as much to another. How much had he left? Answer in bushels, etc.

(3) The road between two villages is 4 rods wide, and contains 32 acres. How far are the villages apart?

(4) I bought butter which I sold at 21 cents per pound, and I gained only 48 cents on the whole. If I had sold it for 15 cents per pound, I would have lost 108 cents on the whole. How many pounds did I buy, and what did I pay for it per pound?

(5) Make a bill of the following articles, and after carefully finding the amount, receipt it: 16 lbs. of butter at 19 cents a lb.; 378 lbs. of hay at $10 a ton; 56 lbs. of barley at 48 cents a bush.; and 139 eggs at 12 cents a doz.

(6) A man sold 3 sheep for $34. For the first he received $4 less than for the second, but $3 more than for the third. What did he get for each?

(7) A woman sold 8 turkeys and 8 geese for $11.60, getting 25 cents a piece more for each turkey than for a goose. What price did she get for each?

(8) Find the aggregate, and also the average price of 12 geese at $1.66 a pair, 15 turkeys at $1.05 each, 17 chickens at 17 cents each, and 12 ducks at 60 cents a pair.

(9) How many barrels of flour, at $7 per barrel, should be given for a pile of wood, 72 feet long, 12 feet wide, and 8 feet high, at $3.50 per cord?

(10) If 1 ton of coal takes up 40 cubic feet of space, how many tons can be put into a bin 6 feet by 8 feet by 5 feet?

EAST MIDDLESEX, 1891.

(1) If 187 miles of railway cost $730,235 to build, find the cost at the same rate of building 159 miles.

(2) 3 bushels of onions are worth $1.19 more than 5 pecks. Find the value of 29 bushels.

(3) (*a*) Walking 3 miles an hour is walking how many rods in 5 minutes?
  (*b*) $3.84 per cord for wood is how much per cubic foot?
  (*c*) 90 cents a bushel for wheat is how much per cwt.?
  (*d*) 4 cents per square foot is how much per square rod?

(4) (*a*) How many inches long, how many inches wide, and how many inches thick is a square foot?
  (*b*) How many inches long, how many inches wide, and how many inches thick is a cubic yard?
  (*c*) How many cubic inches in a cubic yard?

(5) Divide 672 mi. 12 rd. 3 yd. 1 ft. 6 in. by 18. Answer in miles, etc.

(6) Box A contains 22 bush. 3 pk., box B contains 26 bush., box C contains 29 bush. 1 pk., box D contains 32 bush. 2 pk. How many pecks does each of the largest sacks hold which would be capable of exactly holding the contents of any one of the four boxes?

(7) A room, 13 feet 5 inches wide, is carpeted with Brussels 27 inches wide, cut in strips 19 feet long. Find cost of carpet at $1.12½ per running yard.

(8) Make a bill of the following: Mrs. White bought of Messrs. Carter & Colby, March 4th, 1891, 7 lb. 8 oz. of currants at 10 cents a lb., 75 lb. of rice at $5 per cwt., and 18 bars of soap at 3 for 25 cents; March 9th, 19 yards of cotton at 9 cents a yard, and 13 yards of dress goods at 24½ cents a yard; March 18th, 7 quarts of syrup at 80 cents a gallon, and 13 lb. 8 oz. of sugar at 9 lb. for a dollar, and paid $5 on account.

NORFOLK, 1891.

(1) If 49 be added 101 times to itself, by how much will the result fall short of 5,000? (Give the answer in Roman notation.)

(2) A merchant bought 12 gallons of spirits at $3.75 per gallon, but 4 gallons leaked out. At what price per gallon must he sell the remainder so as to gain $2.40 on the whole quantity?

(3) A farmer sold a load of wheat which he weighed in three portions. The first portion weighed 764 pounds; the second, 896 pounds; and the third, 980 pounds. If the price was 92 cents per bushel, how much did he receive for the load?

(4) What number must be added to 7,111 so that it may be exactly divisible by 6,007?

(5) A dishonest milkman bought 8 gallons 3 quarts of milk at 12 cents a gallon, and after adding 1 gallon 2 quarts of water he sold it at 5 cents a quart. How much did he gain on the transaction?

(6) How many yards of carpet, worth $2.50 a yard, can a man get in exchange for 44 bushels of wheat, worth $1.25 a bushel, and 50 bushels of potatoes, worth 50 cents a bushel?

(7) A man dying left to his eldest son, £350 17*s.* 6*d.*; to his second son, £120 18*s.* 9*d.*; to his third son, £100 15*s.*; and to his widow, £300 7*s.* 10*d.* What was the amount left to all four?

(8) Divide 76,943,875,968,362 by 8,379.

(9) James Hamilton bought of Lauder & Co., 14 yards of broadcloth at $2.50 a yard, 16 yards of India muslin at 23 cents a yard, 56 yards of cotton at 9 cents a yard, 24 pounds of sugar at 7 cents a pound, 5 gallons of coal oil at 28 cents a gallon, 5 pounds of Japan tea at 60 cents a pound, 4 pair of shoes at $2.50 a pair, 6 pounds of raisins at 12½ cents a pound. Make out a bill of the above.

(10) What is the least number which, divided by 16, 18, 24, and 35, will leave 13 for a remainder in each case?

PRESCOTT AND RUSSELL, 1890.

(1) Write in figures: One million, thirty thousand, one hundred and four. Write in words: 31,607,014. Write in Roman notation: 93.

(2) A farmer gave 16 bushels of oats for 19 yards of cloth. If the oats were worth 38 cents a bushel, find the value of $2\frac{1}{2}$ yards of the cloth.

(3) Make out a receipted bill for the following: James Jones bought of William Smith, November 2nd, 1890, 14 yards of print at 13 cents a yard; November 3rd, 33 yards of cloth at 44 cents a yard; November 6th, 9 yards of jean at 12 cents a yard; 7 yards of cotton at 14 cents a yard; $3\frac{1}{2}$ yards of lining at 14 cents a yard.

(4) How many bushels of wheat would it take to fill a bin, 8 feet by 4 feet by 3 feet, counting 25 quarts to a cubic foot?

(5) Find the value of 6,924 pounds of hay at $9.20 a ton, and 6,851 pounds of oats at 38 cents a bushel.

(6) Three farmers have 66 sheep among them. The first has 9 more than the second, and the second exactly half as many as the other two together. How many has each?

(7) Find the cost of a pile of wood, 18 feet long, 6 feet high, and 3 feet 6 inches wide, at $2.56 a cord. NOTE.—A cord contains 128 cubic feet.

(8) If 25 pounds of tea cost $8, find the value of 396 lb. 10 oz.

(9) There are 3,564 papers to be read by three examiners. The first reads 73 papers a day; the second, 67. How many must the third read daily that the work may be finished in 18 days?

(10) *A* and *B* lived 990 yards apart. They set out at the same time to walk to each other's houses, and met in 6 minutes. *A* reached *B*'s house in 9 minutes more; when did *B* get to *A*'s house?

(11) If 25 pounds of coffee at 25 cents a pound be mixed with 200 pounds at 40 cents a pound, what is the mixture worth per pound?

(12) The business of a company produces £24,299 14*s.* 5*d.* Of this amount £14,487 16*s.* 11*d.* goes for working expenses, and the remainder is divided equally among 100 shareholders. How much does each get?

(13) A farmer sends the milk of 10 cows to a cheese factory for the season of 150 days. The cows average 21 lb. 7 oz. a day for the first 59 days, and 21 lb. 6 oz. a day for the rest of the season. On the average it takes 10 lb. 1 oz. of milk to make a pound of cheese, and cheese averages $8\frac{1}{2}$ cents a pound. Find the farmer's income from the cheese factory for the season.

DUNDAS, STORMONT AND GLENGARRY, 1890.

(1) Write in Arabic numerals: MDCCCL; DCLIX; MCDL.

(2) Write in Roman numerals: 1,890; 347; 562.

(3) If 18 bushels of oats cost $6.30, find the value of a load of oats weighing 2,040 pounds.

(4) A farmer bought 7½ yards of cloth at 90 cents a yard; 12 yards of print at 10 cents a yard; 5 gallons of coal oil at 30 cents a gallon; and 4 pounds of tea at 35 cents a pound; and gave in payment 50 pounds of butter at 20 cents a pound. How much change should the farmer receive?

(5) A man engaged to work at the rate of 80 cents a day for every week day, commencing on Monday, the 7th April, and ending on Saturday, the 28th June. How much wages is due him?

(6) How many bushels of wheat, at 95 cents a bushel, can be bought for 152 bushels of oats at 40 cents a bushel?

(7) The product is 145,692, the multiplier is 342; find the multiplicand.

(8) If a man earns $45 a month, and spends $25 a month, how many years will it take him to pay for a house and lot worth $1,200?

(9) From 76 bush. 1 pk. 1 gal. 3 qt. 1 pt. take 28 bush. 2 pk. 2 qt.

(10) Multiply 12 ac. 3 rd. and 25 po. by 6.

(11) Find the cost of digging a cellar, 32 feet long, 25 feet wide, and 6 feet deep, at 36 cents per cubic yard.

(12) A train runs at the rate of 30 miles an hour for 9 hours. How many days will a man take to walk the same distance at the rate of 3 miles an hour, walking 6 hours a day?

PERTH, 1891.

(1) A 100-acre farm is 80 rods wide. How much would it cost to put a fence around it at 20 cents a yard?

(2) How long would 2,210 pounds of oats last a horse if he get 4 gallons a day?

(3) If 12 barrels of apples cost $28.25, what would 100 barrels cost?

(4) Describe a *rectangular* field.

(5) A man worked 47 days at $1.10 a day. He received in payment $41.50 cash, and a quantity of apples at 30 cents a bushel. How many bushels did he get?

(6) A rectangular cistern is 4 feet by 4 feet by 4 feet. How many gallons of water will it hold?

(7) A drover bought 30 sheep at $8 a head, 20 at $7.55 a head, and 15 at $6 a head. He sold the lot for $539.50. What was his average gain per head?

(8) How long would it take to dig a garden containing 4 ac. 28 sq. rd., at the rate of 60 sq. rd. 22 sq. yd. a day?

(9) If a dozen eggs weigh 1 lb. 8 oz., what would 100 eggs weigh?

(10) How many feet (board measure) in 30 planks 14 feet by 9 inches by 2 inches?

SOUTH HASTINGS, 1891.

(1) How many pounds of butter, at 19 cents a pound, can be bought for three thousand and seventeen dollars?

(2) Find the value of 67,846 feet of boards at $14.87 per M.

(3) A horse and cutter were worth $375, the horse being worth $199.86 more than the cutter. How much was each worth?

(4) How many tons of hard coal will a rectangular bin, 9 feet long, 7 feet 8 inches wide, and 4 feet 6 inches deep, hold?

(5) How many acres, etc., in a road 12 mi. 140 rd. 4 yd. long, and 120 ft. wide?

(6) A farm, 80 chains long, and 40 rods wide, is to be divided into 9 fields of equal size. How many ac. rod. yd. ft. and in. in each field?

(7) Find the total cost of the following at $14 per M.:—90 boards, 13 feet long, 8 inches wide, and 1 inch thick, and 40 planks, 13 feet long, 6 inches wide, and 2 inches thick.

(8) How many barrels and gallons of water in a rectangular cistern, 8 feet long, 6 feet wide, and 7 feet 9 inches deep?

(9) Find the total cost of the following:—1,840 lb. of oats at 52 cents per bush., 7,848 lb. of barley at 56 cents per bush., 1,940 lb. of hay at $8 per ton.

(10) Find the total cost of the following:—$16\frac{3}{4}$ lb. at 28 cents per lb., $24\frac{5}{6}$ lb. at 42 cents per lb., $39\frac{2}{3}$ lb. at 24 cents per lb., $11\frac{1}{6}$ lb. at 12 cents per lb.

(11) Find the aggregate, and also the average price of 12 geese at $1.66 a pair, 15 turkeys at $1.05 each, 17 chickens at 17 cents each, and 12 ducks at 60 cents a pair.

(12) How many barrels of flour, at $7 per barrel, should be given for a pile of wood, 72 feet long, 7 feet high, and 4 feet wide, at $3.50 per cord?

PRINCE EDWARD, 1890.

(1) Find the quotient when the product of 867,493 and 3,648 is divided by 867.

(2) Find the amount of the following bill:—4,750 feet of lumber at $8.50 per M., 8,400 fence pickets at $12 per M., 16,300 bricks at $7.25 per M., 4,680 pounds of hay at $8 per ton.

(3) How many minntes in 4 yr. 26 wk. 4 dy. 18 hr.?

(4) What is the profit on 62 gallons of milk that cost $12\frac{1}{2}$ cents per gallon, if it is sold at 3 cents per pint?

(5) If 4 horses eat 24 bushels of oats in 3 weeks, how many bushels would 5 horses eat in 5 weeks?

(6) If a train moves 48 feet per second, how many miles is that per hour?

LAMBTON, 1890.

(1) Find the cost of a pile of wood, 28 feet long, 8 feet wide, and 6 feet high, at $4.50 per cord.

(2) A grocer paid $7.20 for a barrel of vinegar, and found it cost him 3 cents a pint. How many gallons were there?

(3) A field is 242 yards long, and 216 yards wide. How many acres does it contain?

(4) Make out the following bill:—$12\frac{1}{2}$ lb. of sugar at 10 cents per lb., 90 lb. of wheat at 80 cents per bush., 150 lb. of flour at $3.50 per cwt., 16 bars of soap at 4 for 25 cents.

(5) How many bricks, 8 inches long, $4\frac{1}{2}$ inches wide, laid flatwise, will be needed to pave a rectangular yard, 48 feet by 30 feet?

(6) A man makes $700 a year, but his expenses are $6 a week. How many years before he will be worth $7,544, if he has now $2,500 saved?

(7) Find the value of 604,985 bushels of wheat, at 87 cents per bushel.

(8) Reduce 144 tons 1,650 lb. 7 oz. to ounces.

(9) How many quart boxes will be needed to hold 8 bush. 2 pk. 1 gal. 2 qt. of strawberries?

(10) Find the sum, difference, product, and quotient of 1,205 and 19,280. (Four answers.)

(11) A boy walks 18 mi. 50 yd. and 4 ft. in a day. How far will he walk in 6 days?

(12) How many pounds of butter, at 2 cents per ounce, will pay for 276 pounds of sugar, at 2 ounces for 1 cent?

(13) Divide 3,498,765,324 by 3,897. (Perfect work.)

(14) A man failing in business can pay two-thirds of his debts. A creditor to whom he owed one-third of his whole debt, got $800. What was his debt to this creditor; and what was the amount of his whole debt?

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